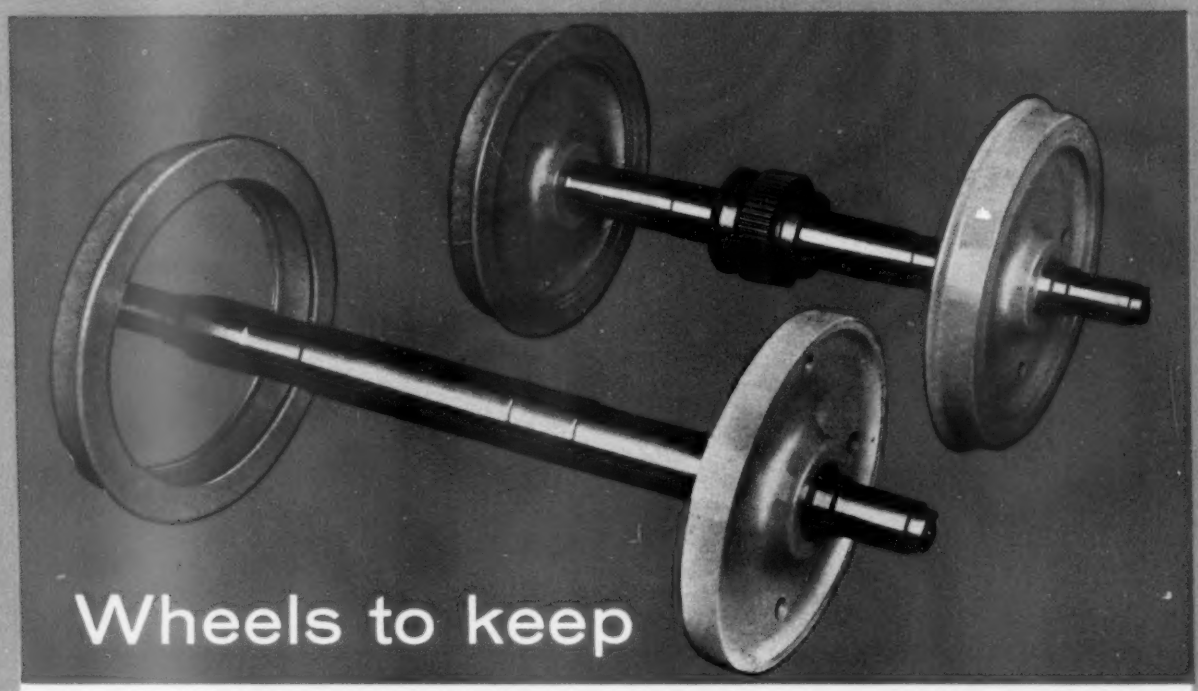
THE
RAILWAY GAZETTE

Price: Two Shillings | FRIDAY, JULY 21, 1961 | Annually £5 by post



the diesel railcars rolling

Wheels, tyres, and axles for all types of rolling stock are manufactured by Steel, Peech & Tozer, and machined and assembled into complete sets by Owen & Dyson Limited.

With nearly seventy years' experience, Steel, Peech & Tozer is well-equipped to supply the railways of the world with special quality steels to withstand high temperatures and high levels of stress.

steel, peech & tozer

THE ICKLES · ROTHERHAM · YORKSHIRE

A branch of The United Steel Companies Limited

THE UNITED STEEL COMPANIES LTD

SP 231

***British Railways Palvans run on* SKF**

British Railways are co-operating with traders in the development of palletised services for the safe, speedy and economical handling of small packages of uniform dimensions.
The 'Palvan' shown in our illustration is equipped with SKF spherical roller bearing axleboxes, giving complete reliability, high load carrying capacity and economy of maintenance.

SKF SPHERICAL ROLLER BEARING AXLEBOXES

THE SKEFKO BALL BEARING COMPANY LIMITED · LUTON · BEDS

OVER 1,750,000 SKF ROLLER BEARING AXLEBOXES HAVE NOW BEEN SUPPLIED TO THE RAILWAYS OF THE WORLD

THE HEY-BACK RAIL FASTENING

The POSITIVE elastic fastening

The Hey-back Rail Fastening with its specially designed baseplate and spring clip provides an effective elastic fastening of the rail independent of the fixing of the baseplate to the sleeper. The fastening allows rails to be removed and replaced with speed and economy of labour. The fastening is adaptable to both wood and concrete sleepers, is simple and requires neither special tools nor skilled labour for fitting and maintenance.

The photograph on the left shows the Hey-back System in use near Neasden on an electric track of the London Transport Executive, whose permission to reproduce this photograph is gratefully acknowledged.

Further technical data gladly supplied on request.

WORKINGTON IRON & STEEL COMPANY

MAKERS OF RAILS, FISHPLATES, BASEPLATES AND STEEL SLEEPERS

A branch of The United Steel Companies Limited

WORKINGTON Phone: Workington 206 Grams: "Mosbay" Workington CUMBERLAND

THE UNITED STEEL COMPANIES LTD

Railway Department: 8/10 Grosvenor Gardens, Victoria, London, S.W.1. Phone: Sloane 4533. Grams: Unisteels Sowest, London

W109 a

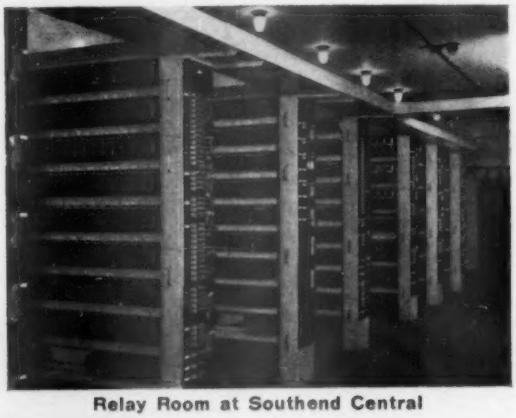
A

Miniature Type Control Desk at Southend Central

MINIATURE CONTROL DESKS AND RELAYS

Southend Central and Pitsea Junction on the Eastern Region of British Railways have recently been equipped with the "all-electric" push-button system employing a miniature type control desk which enables one man to operate the entire interlocking area.

In the relay rooms approximately 1,500 miniature relays have been fitted, thus effecting a considerable space economy.



Relay Room at Southend Central

WESTINGHOUSE

SIGNALLING *for* **RAILWAY MODERNISATION**

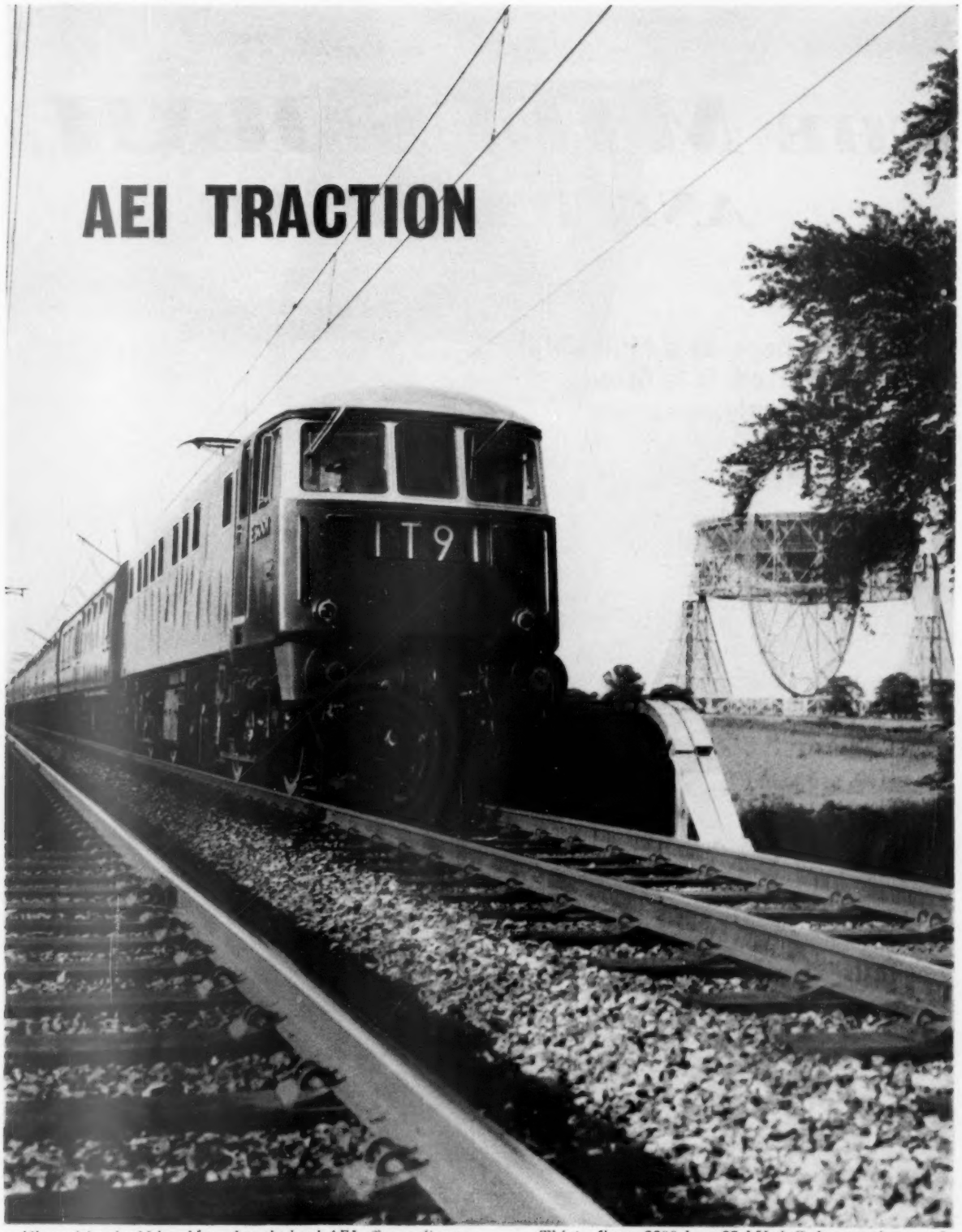
BRITISH DESIGN AND MANUFACTURE

WESTINGHOUSE BRAKE AND SIGNAL CO. LTD., 82 York Way, King's Cross, London, N.1

Saxby & Farmer (India) Private Ltd., Calcutta. McKenzie & Holland (Australia) Pty., Ltd., Melbourne.

Westinghouse Brake and Signal Co., S.A. (Pty.), Ltd., Johannesburg. *Agents—Bellamy & Lambie, Johannesburg.*

AEI TRACTION



All enquiries should be addressed to the local AEI office or direct to AEI Traction Division, Trafford Park, Manchester 17.

Thirty-five—3300 h.p. 25 kV A.C. locomotives, and forty sets of locomotive electrical equipment have been ordered from AEI by British Railways.

AEI **Associated Electrical Industries Ltd.**

Traction Division

MANCHESTER and LONDON

K/T015

THE MILLS RAIL PATENT AND BASEPLATE

Whenever a Mills Clip is fitted, it is fitted correctly.

Photograph by Courtesy of British Railways

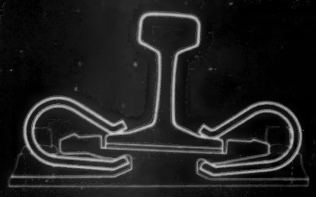
A MEMBER OF THE GKN GROUP OF COMPANIES

EXORS OF JAMES MILLS LTD

BREDBURY STEEL WORKS

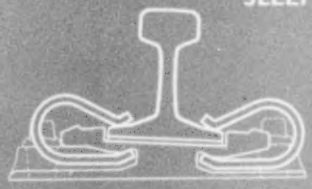
CLIP

FOR WOOD SLEEPERS



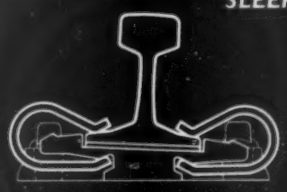
Four-hole baseplate with or without rubber rail pad.

FOR 'E' TYPE CONCRETE SLEEPERS



Two-hole baseplate, interchangeable with CSI Bullhead Chair.

FOR 'F' TYPE CONCRETE SLEEPERS



Small Area two-hole baseplate for main line use.

Every Mills Clip fitted applies a uniform load to the rail within a known range.

Very suitable for long welded rails and all heavy duty track

WOODLEY · NEAR STOCKPORT

Telephone: WOOdley 2231 (7 lines) 3431 (7 lines) Cables: Mills Woodley

Wheels Tyres Axles

and complete wheel pairs

for the railways of the world

RINGS and CIRCULAR DIE FORGINGS

Seamless Rings in Carbon and Alloy Steels. Flanges of all types. Gear Rings and other rings with square, rectangular or profiled cross section, from 6 in. (minimum weight 70 lbs.) to 78 in. inside diameter and from 2 to 12 in. axial width. Circular Die Forgings, maximum weight 2,000 lbs.—plain or punched slabs and special shaped forgings up to 40 in. diameter.

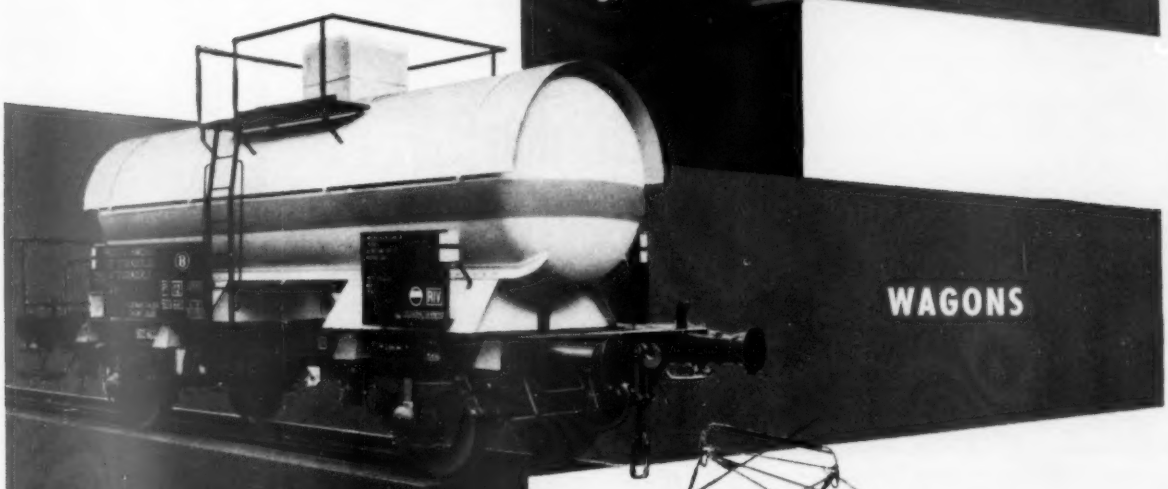
Taylor BROS. & CO. LTD

TRAFFORD PARK STEELWORKS, MANCHESTER 17

LONDON OFFICE: ST. ERMIN'S, CAXTON STREET, WESTMINSTER, S.W.1

DEUTZ

DIESEL LOCOMOTIVES



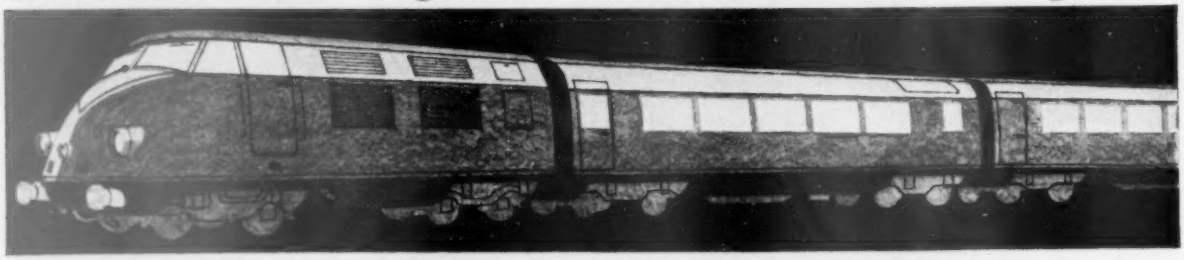
WAGONS

WESTWAGGON

SUBURBAN AND
INTER-URBAN RAILWAYS

KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN, WERK WESTWAGGON

Now ...**TRIPLEX** Toughened Glass for tomorrow's rolling stock



For many years now, Triplex glass has been a familiar and reassuring feature to millions of motorists. Now Triplex Toughened Glass joins Triplex Laminated Glass in the industrial field. It is available now to the designers and manufacturers of railway carriages and other rolling stock. If you have any technical problems or special requirements concerning safety glass, write to us.

TRIPLEX

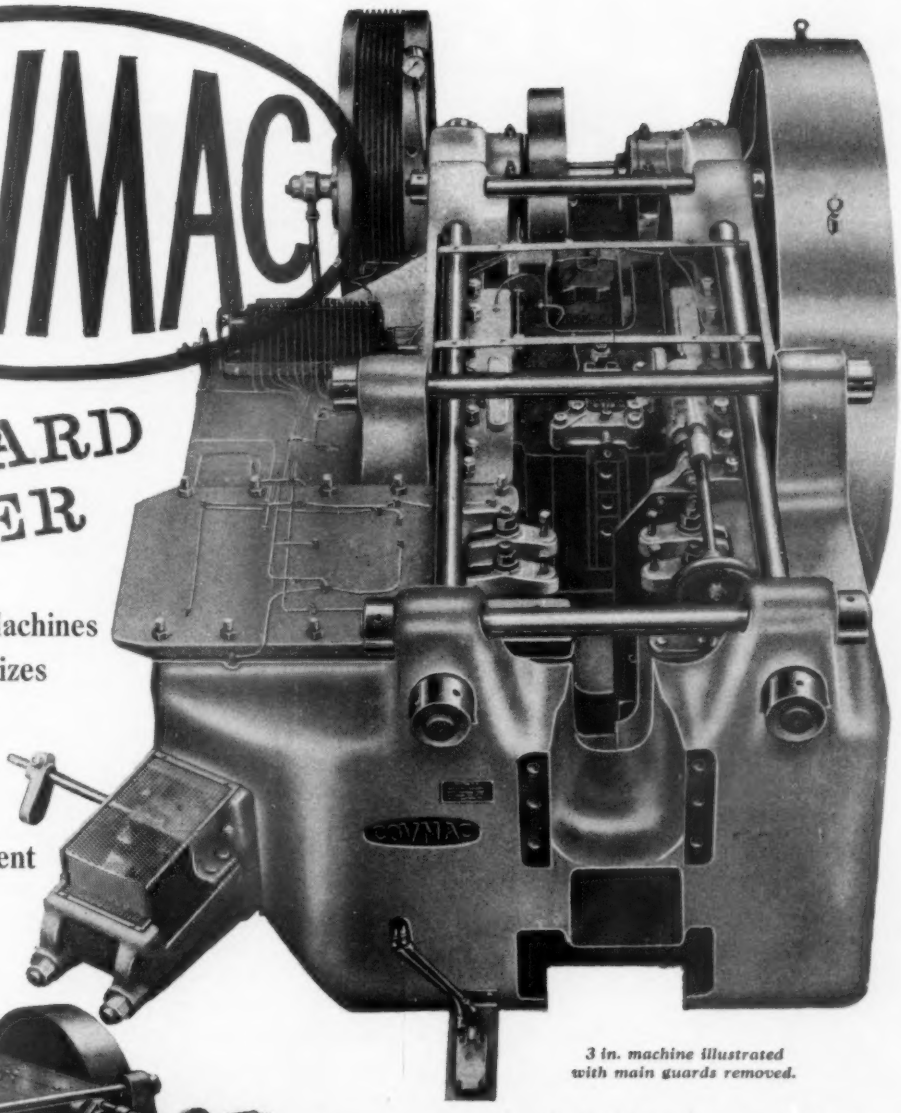
THE TRIPLEX SAFETY GLASS COMPANY LTD. AT HYTHE ROAD, WILLESDEN, LONDON, N.W.10, KINGS NORTON, BIRMINGHAM, OR ECCLESTON, ST. HELEN'S, LANCS.

COVMAC

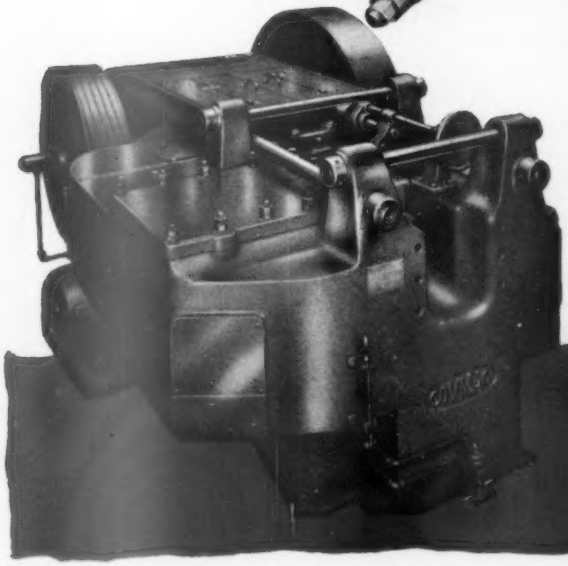
STANDARD FORGER

Covmac Forging Machines are made in nine sizes to take bars from $\frac{3}{4}$" to 6" diameter.

Safety devices on all models prevent overloading.



3 in. machine illustrated with main guards removed.



Covmac also make Automatic Forging Machines, as well as machines for making balls up to and including 4 ins. diameter. In addition there are three sizes of Hot Milling and Sawing Machines.

COVENTRY MACHINE TOOL WORKS LTD

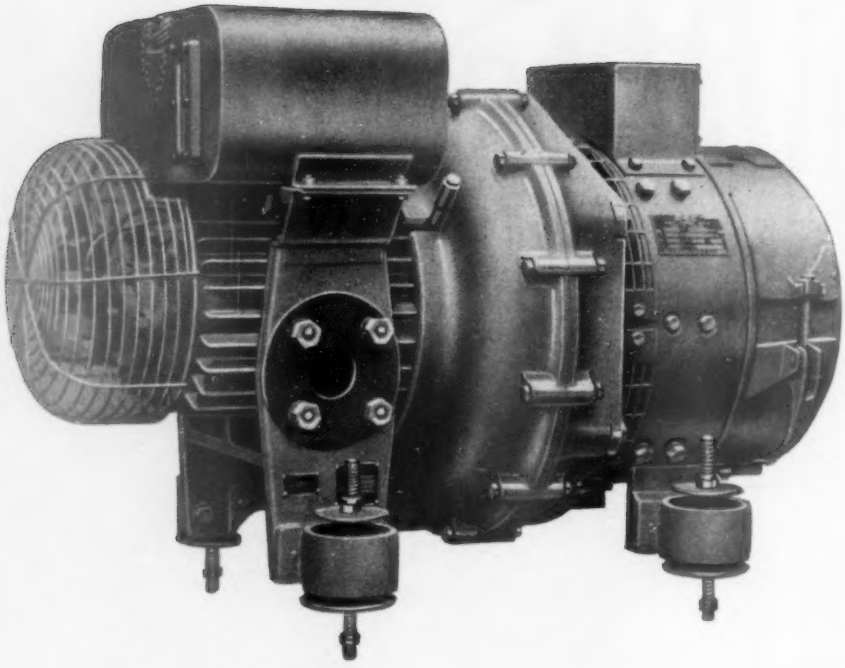
GRANTHAM RD.
HALIFAX
ENGLAND

'Phone: Halifax 3234/5 'Grams: Covmac Halifax

OVERSEAS AGENTS:

AUSTRALIA: Gilbert Lodge & Co. Ltd., 386 Harris Street, Ultimo, Sydney, N.S.W. CANADA: Williams & Wilson Ltd., 544 Inspector Street, Montreal FRANCE: Societe Anonyme Alfred Herbert, 1 and 3 Rue du Delta, Paris (9e). HOLLAND: Esmeijer & Co., Oosterkade 24, Rotterdam C. INDIA: Alfred Herbert (India) Ltd., 13/3 Strand Road, P.O.B. 681, Calcutta 1. NEW ZEALAND: Gilbert Lodge & Co. Ltd., Head Office: 55, Station Road, P.O.B. 12-063, Penrose, Auckland, S.E.6. N.Z. also at Christchurch and Wellington. PAKISTAN: Guest Keen & Nettlefolds, in Pakistan Ltd., P.O.B. 819, Bank of India Buildings (3rd Floor), Bunder Road, Karachi. SPAIN: Gumuzio S.A. Gran Via 48, Apartado 920, Bilbao. KENYA, UGANDA, TANGANYIKA & ZANZIBAR: Len Cooper Ltd., P.O.B. 3796, Nairobi, Kenya. SWEDEN: Aktiebolaget Servus, Malmskillnadsgatan 46, Stockholm.

B



VACUUM BRAKE EXHAUSTERS

The Consolidated Brake—Reavell Exhauster illustrated here offers maximum efficiency with minimum weight. These latest Flange-Mounted Exhausters are now being supplied to British Railways. For further details write to:

THE CONSOLIDATED

BRAKE & ENGINEERING CO., LTD.

SLOUGH, BUCKS, ENGLAND

(A member of the G. D. Peters Group.)

ELECTRICALLY CONTROLLED Railway Sidings

by SUMMERSON'S

This sidings contract for the North West Gas Board, Mersey Group, had to be laid without disturbing existing gas production. As Consulting Engineers working with the Gas Board engineers, Summerson's surveyed and designed the layout and drew up a specification. As main contractors, Summerson's manufactured and installed the track which consisted of two different designs. One, involved 8,100 yards of track which included 41 turnouts, 12 tandem turnouts and 3 single cross overs, the other consisted of 765 yards of fully guarded track for fixing in concrete to top rail level, including a scissors cross over and turnouts. The main coke sidings have electro-pneumatically operated switches to direct wagons which move from the tippler tables by gravity, into the correct road. Just another example of how Summerson's experienced "know how" enables a difficult installation to be successfully carried out.

MAIN CONTRACTORS: Thomas Summerson & Sons, Ltd. CIVIL WORK: Leonard Fairclough Ltd. ELECTRO-PNEUMATIC EQUIPMENT: Westinghouse Brake & Signal Co. Ltd.

THOMAS SUMMERSON & SONS, LTD., MOWDEN HALL, DARLINGTON, CO. DURHAM. Telephone: DARLINGTON 5226

London Office: 5a Dean's Yard, S.W.1. Abbey 1365

RTB

Foundry and Engineering Service for Industry

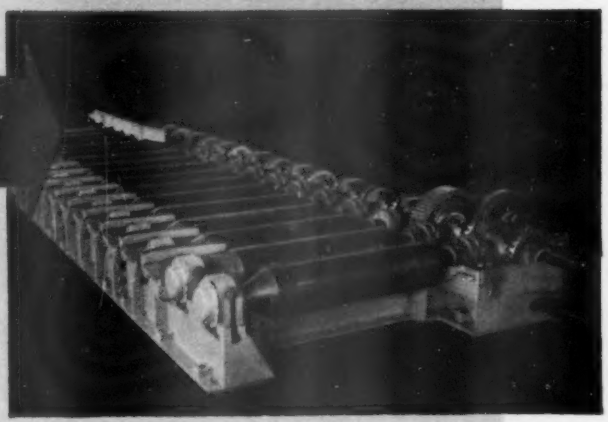
Our foundries and engineering shops, the largest in South Wales, provide a service, not only to the nation's steel industry, but to a variety of industries throughout Britain and the world.

Carbon Steel Castings up to 10 tons.
Spheroidal Graphite Iron Castings up to 10 tons.
Non-Ferrous Castings up to 15 cwts.

The 'Centriblast' machine illustrated is capable of shot blasting 15 tons of material at one loading.

Steel construction, Fabrication and General Repair Work.
All Types of Fabrication of mild and alloy steels up to 25 tons.

The 'Fusarc' welder has a 50 ft. straight run and a reach of 50 in.; it is also equipped to carry out 'submerged welding'.



Machine and Erecting Shops. Our machine and erecting shops with 30-ton gantries are equipped to handle light and heavy machine work.
Special-Purpose Machines. We undertake the complete manufacture of machines to customers' design.

The Table Rollers illustrated are for the strip mill being built for the Ebbw Vale works by Davy & United Engineering Co. Ltd.

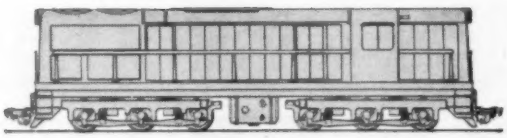
Richard Thomas & Baldwins Limited

SALES DEPARTMENT, FOUNDRY AND ENGINEERING WORKS, MACHYNYS, LLANELLY, CARMS.

Telephone: LLANELLY 3291 (4 lines)

Head Office: 47 Park Street, London, W.1

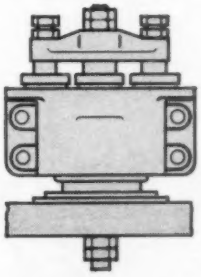
Further Foundries and Engineering Facilities at our LANDORE GROUP OF WORKS, *Swansea*



GOING PLACES WITH BTR VIBRO-INSULATORS

Going places in East Africa is the A.E.I./Lister Blackstone 'Explorer', fitted—in common with so much of today's rolling stock—with BTR Vibro-Insulators.

Designed to utilize the greatly superior vibration absorption qualities of rubber-in-shear as opposed to rubber-under-compression, Vibro-Insulators are playing an ever-increasing part in railway modernization.



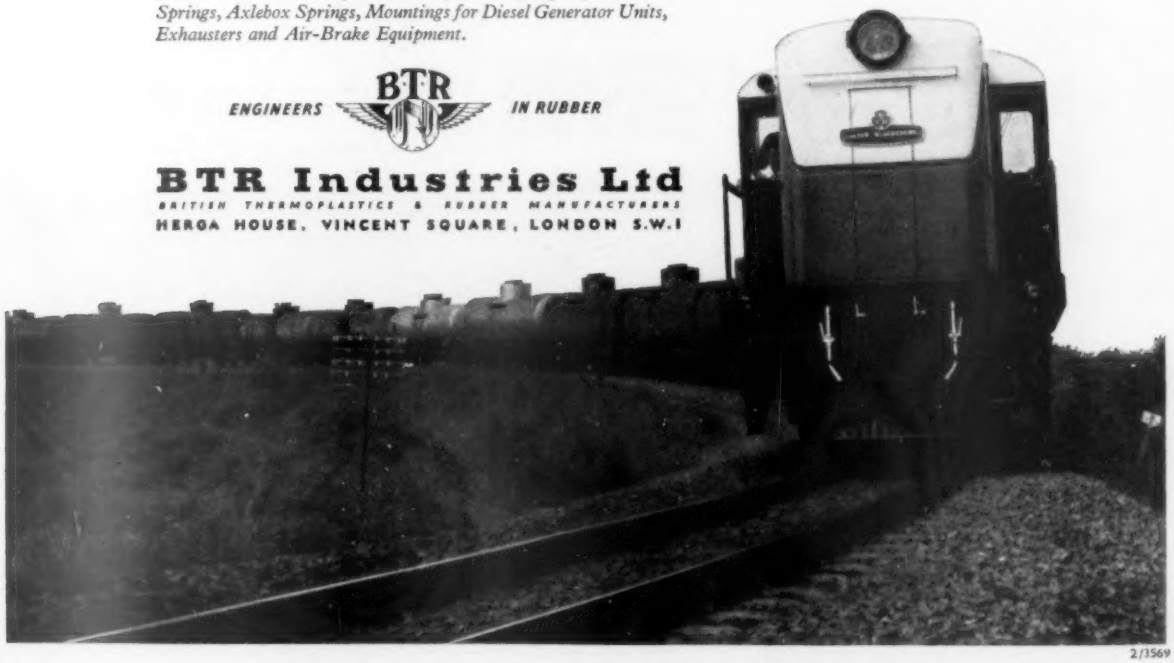
BTR Vibro-Insulators for Auxiliary Bearing Springs, Bolster Springs, Axlebox Springs, Mountings for Diesel Generator Units, Exhausters and Air-Brake Equipment.

ENGINEERS BTR IN RUBBER

BTR Industries Ltd

BRITISH THERMOPLASTICS & RUBBER MANUFACTURERS

HERGA HOUSE, VINCENT SQUARE, LONDON S.W.1



2/3569

LAMINATED PLASTIC SIGNS

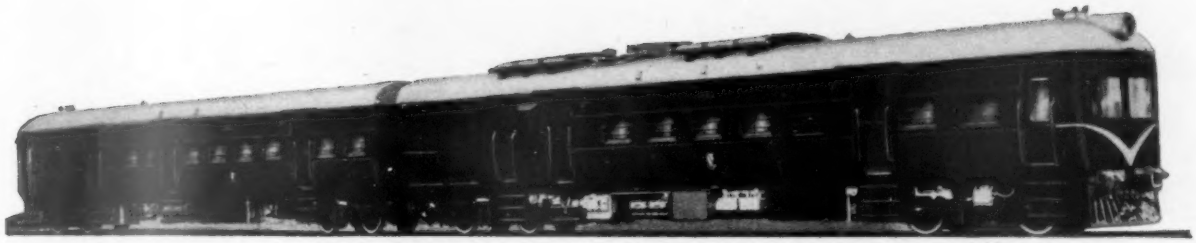
LAMIGRAPH LAMINATED PLASTIC SIGNS
LAMIGRAPH *plus* SCOTCHLITE REFLECTIVE SIGNS
LAMIGRAPH STOVE ENAMELLED SIGNS
LAMIGRAPH SCREEN-PRINTED SIGNS

SAFETY SIGNS, GENERAL NOTICES,
NAMEPLATES, DIAGRAMS, ILLUSTRATIONS,
MIMIC CONTROL PANELS, ETC.

Lamigraph LIMITED

273 OLD SHOREHAM ROAD · HOVE · SUSSEX · Phones: HOVE 70444 & 71464 . 'Grams: LAMIGRAPH, HOVE

DREWRY RAIL CARS

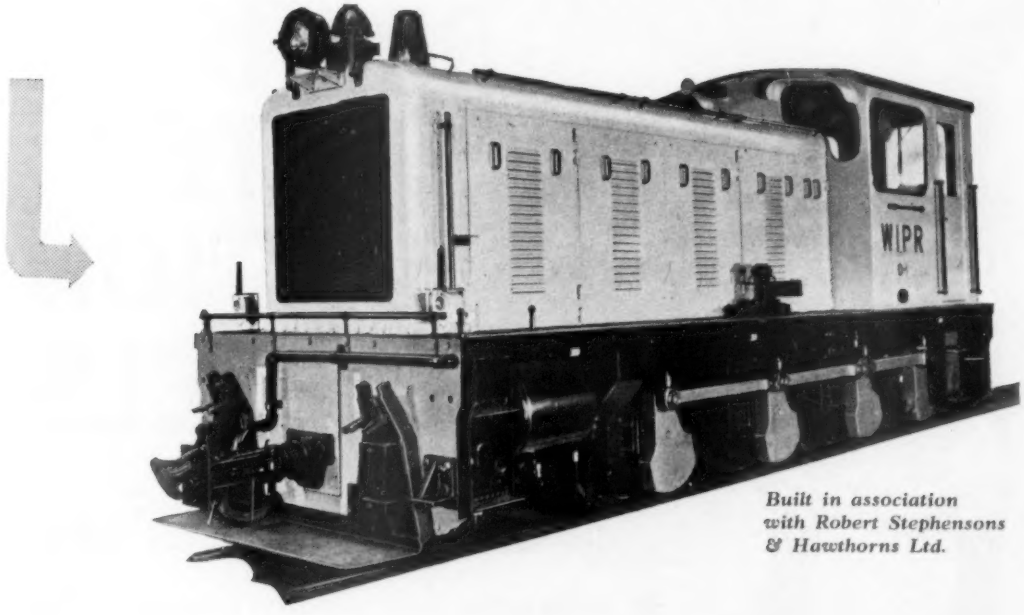


Built in association with The Birmingham Railway Carriage & Wagon Co. Ltd.

WITH MECHANICAL OR HYDRO-MECHANICAL TRANSMISSION

The upper illustration shows one of two Twin Car Units shipped this year to the Nigerian Railway Corporation, equipped with twin underfloor engines totalling 400 h.p. and multiple-speed epicyclic transmission with automatic control. The lower illustration is one of a number of 30-ton metre gauge Drewry locomotives recently shipped to Portuguese India, for freight and passenger duties.

AND LOCOMOTIVES



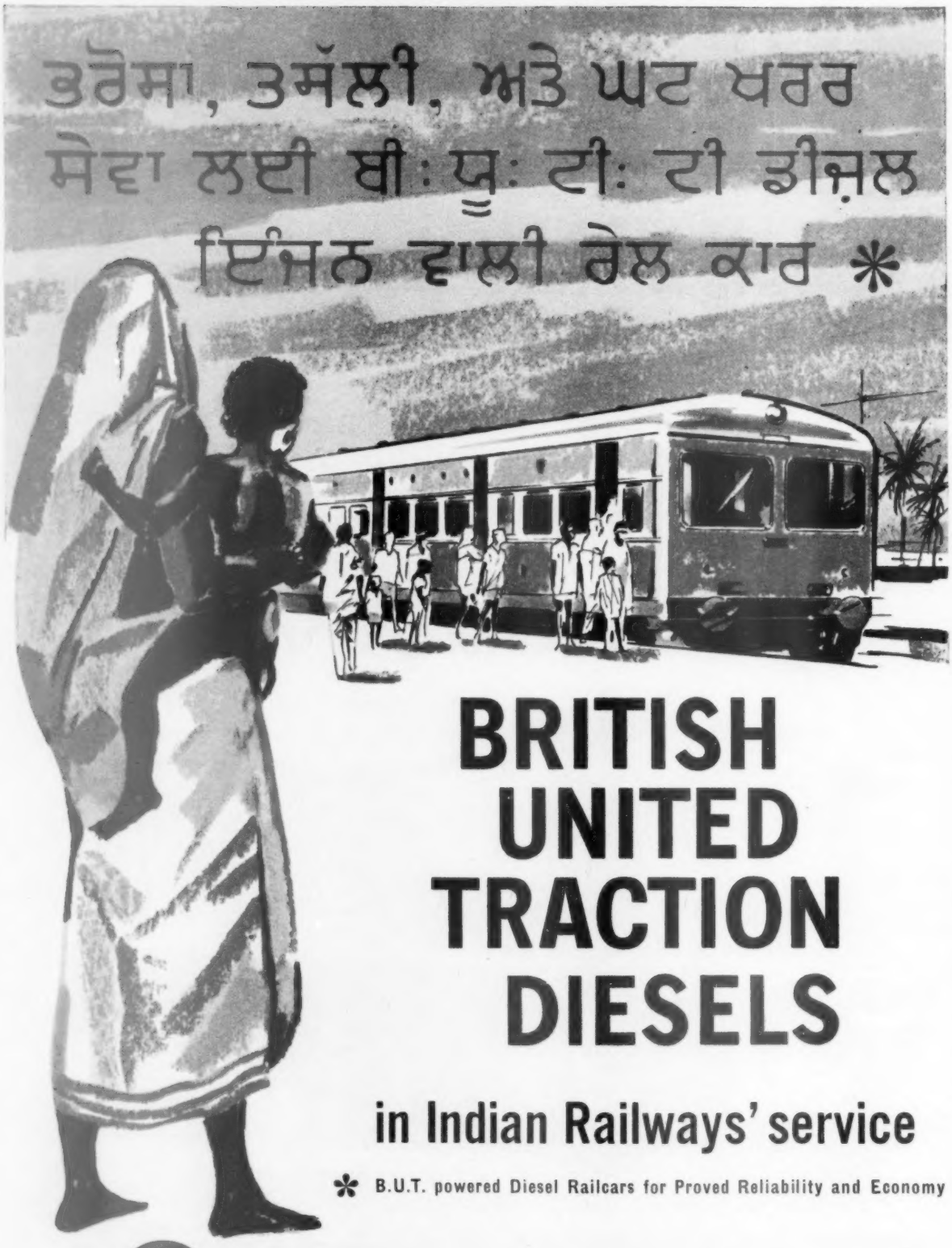
Built in association with Robert Stephensons & Hawthorns Ltd.

THE DREWRY CAR COMPANY LTD.

CITY WALL HOUSE, FINSBURY PAVEMENT, LONDON, E.C.2

TEL.: MONARCH 0671 GRAMS: INNEAL, PHONE, LONDON

ਭਰੋਸਾ, ਤਸੱਲੀ, ਅਤੇ ਘਟ ਖਰਚ
ਸੇਵਾ ਲਈ ਬੀ: ਯੂ: ਟੀ: ਦੀ ਡੀਜ਼ਲ
ਇੰਜਨ ਵਾਲੀ ਰੇਲ ਕਾਰ *



BRITISH UNITED TRACTION DIESELS

in Indian Railways' service

* B.U.T. powered Diesel Railcars for Proved Reliability and Economy

BRITISH UNITED TRACTION LIMITED
Uniting the Rail Traction Resources of A.E.C. and Leyland
96 PICCADILLY · LONDON W.1 · TELEPHONE: GROSVENOR 7121

STC PUBLIC ADDRESS & LOUDSPEAKER SYSTEMS FOR RAILWAYS

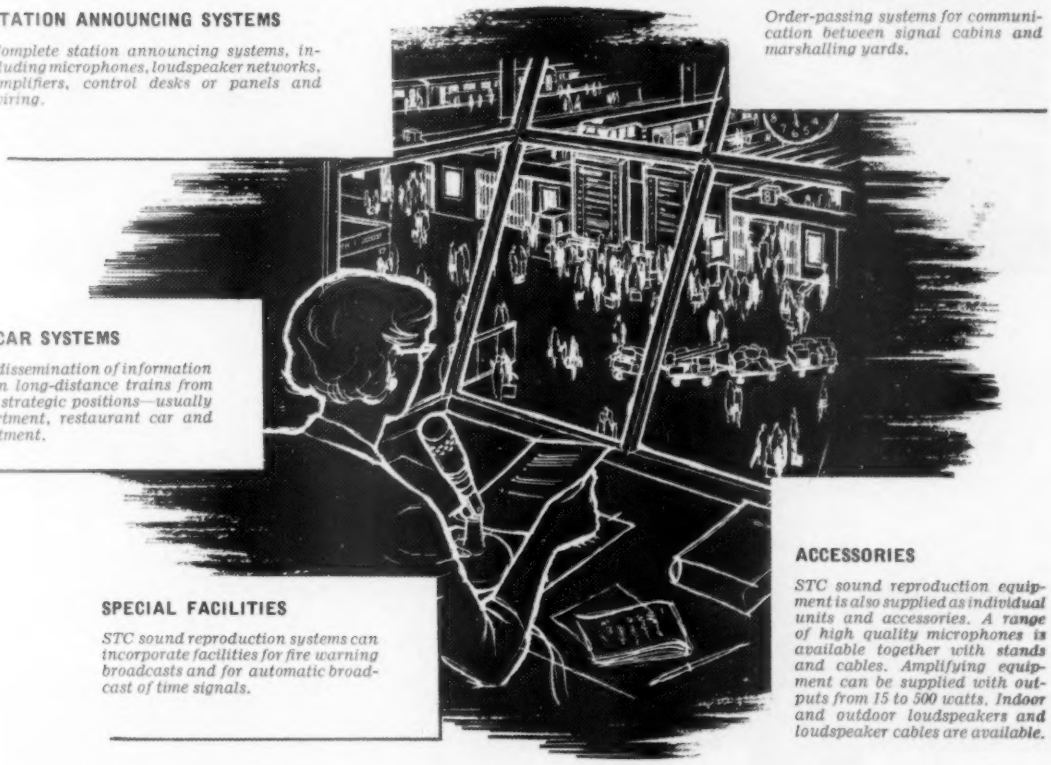
STC design and manufacture a variety of equipment and instruments for sound reproduction purposes, and a special department is concerned with the planning and installation of complete loudspeaker systems. For more than thirty years the Company has been engaged in the engineering and installation of large and small sound reproduction systems, indoors and outdoors, permanent and temporary. Many of the installations have been of the most complex nature and STC sound engineers have the advantage of wide practical experience in the choice and siting of equipment to achieve the best possible distribution of sound with minimum deleterious effects. Particularly valuable experience is available for the acoustic grouping of loudspeaker networks.

STATION ANNOUNCING SYSTEMS

Complete station announcing systems, including microphones, loudspeaker networks, amplifiers, control desks or panels and wiring.

TRAFFIC SYSTEMS

Order-passing systems for communication between signal cabins and marshalling yards.



PASSENGER CAR SYSTEMS

Systems for the dissemination of information to passengers on long-distance trains from microphones in strategic positions—usually guard's compartment, restaurant car and driver's compartment.

SPECIAL FACILITIES

STC sound reproduction systems can incorporate facilities for fire warning broadcasts and for automatic broadcast of time signals.

ACCESSORIES

STC sound reproduction equipment is also supplied as individual units and accessories. A range of high quality microphones is available together with stands and cables. Amplifying equipment can be supplied with outputs from 15 to 500 watts. Indoor and outdoor loudspeakers and loudspeaker cables are available.

STC COMMUNICATIONS GROUP

61/3 CPA

Standard Telephones and Cables Limited

PUBLIC ADDRESS DEPARTMENT

HIDE PLACE WORKS · ESTERBROOKE STREET · LONDON · S.W.1

C

Railway Electrification

Published by courtesy of the main contractors Messrs. British Insulated Callenders Construction Company Limited.

SCHEMES SUPPLIED:

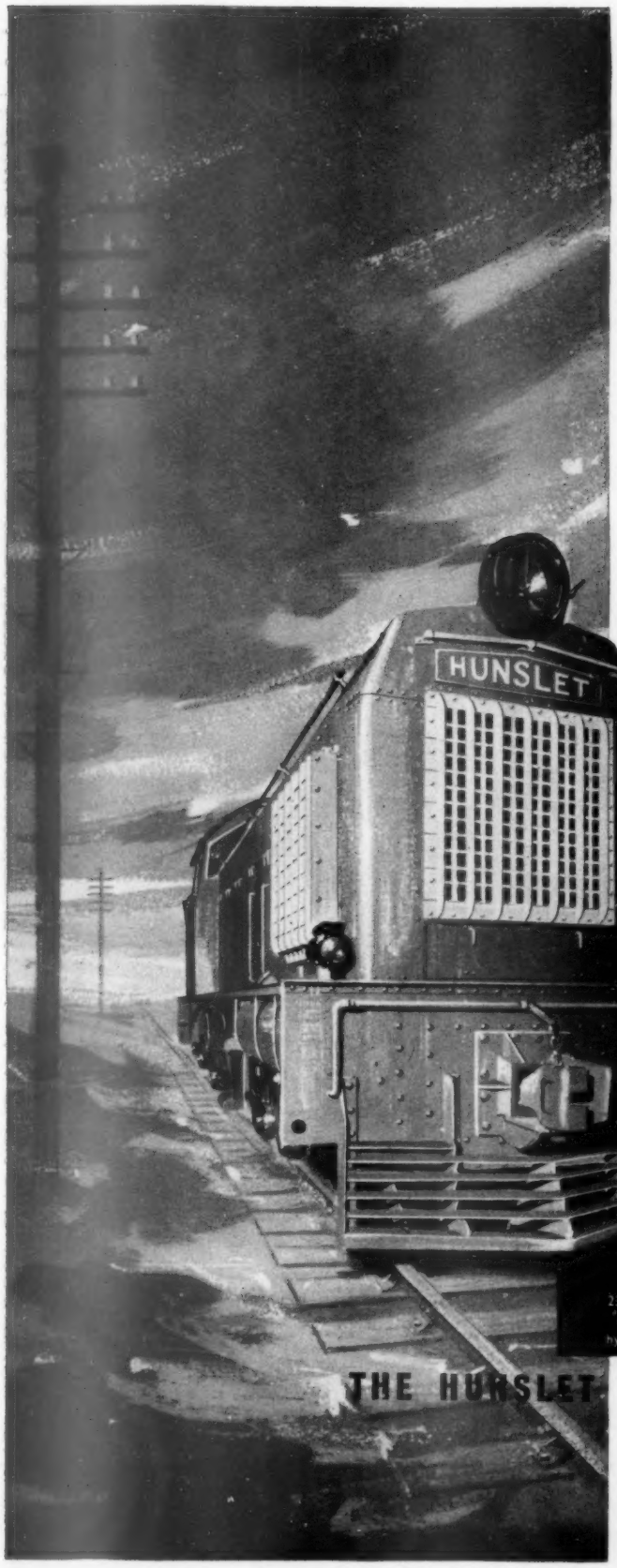
British Railways (conductor rail, overhead AC & DC)
London Passenger Transport Board (conductor rail)
Argentine Railways (conductor rail)
Brazilian Railways (overhead)
Bolivian & Chilean Railways (conductor rail)
Indian Railways (overhead)
New South Wales Railways (overhead)
Polish State Railways (overhead)
South African Railways (overhead)
Victorian State Railways (overhead)

Bullers Limited have supplied insulators and metal fittings for railway electrification schemes (Conductor Rail and Overhead Systems) during the past 50 years.
The above illustration of the British Railways 25 kV. A.C. system is one of the latest schemes on which Bullers insulators and fittings have been used.

BULLERS LIMITED MILTON · STOKE-ON-TRENT · STAFFS

Phone: Stoke-on-Trent 54321 (5 lines). Grams & Cables: Bullers, Stoke-on-Trent

. . Ironworks : TIPTON, STAFFS, *Phone : Tipton 1691.* London Office : 6 LAURENCE POUNTNEY HILL, E.C.4 *Phone : MANsion House 9971*



HUNSLET LOCOMOTIVES

serve the world

Hunslet locomotives have a reputation for absolute reliability. That is why you will find them all over the world, in all climates, on every class and gauge of railway.

Wherever they are, above or below ground, on plantation or docks, on contracting work, or main line haulage, Hunslet Locomotives have remained in the lead for quality for nearly 100 years.

23 H.P. 'Tiger Tim' mines type diesel hydraulic locomotive

270 H.P. 0-6-0 Type diesel-hydraulic locomotive

637 H.P. 0-8-0 Type diesel-hydraulic locomotive

THE HUNSLET ENGINE CO. LTD. LEEDS 10

London Office: Locomotive House, Buckingham Gate, S.W.1.

Associated Companies:

Hunslet Taylor Consolidated (Pty) Ltd., P.O. Box 57, Cleveland, Transvaal.

Hunslet Engineering Central Africa (Pvt) Ltd., P.O. Box 2581, Salisbury, S. Rhodesia.

Hunslet Locomotives Canada Ltd., P.O. Box 580, Haileybury, Ontario.

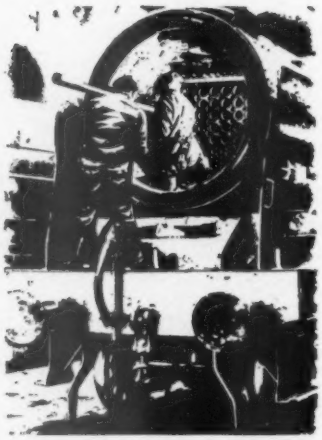
Agents in many parts of the world

H 88

'ALFLOC' ON THE FOOTPLATE

Like most of us, the 'Alfloc' man probably once wanted to be an engine-driver. And, though his one-time ambition may have eluded him, he plays a vital part in helping the engine-driver. For 30 years, the 'Alfloc' Water Treatment Service of Imperial Chemical Industries Ltd. has been building up an unparalleled volume of skill and experience in handling problems of railway water treatment. Today, the 'Alfloc' man is helping to keep engines—both steam and diesel—out of the time-consuming sheds, helping to avoid exasperating breakdowns, helping to eliminate all problems connected with water usage.

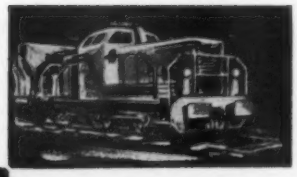
Maybe the 'Alfloc' man can't drive the engine—but he brings the scientific and technological resources of I.C.I. to bear on all water problems that arise in keeping the engines running.

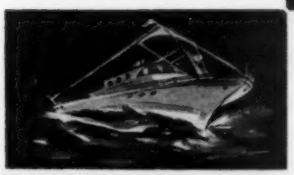


'alfloc' ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED
'ALFLOC' WATER TREATMENT SERVICE,
4 CROMWELL PLACE, LONDON, S.W.7.

AL.42





the engine which suits every situation

the engine which is given the most varied applications

175 CO

Semi-finished products for re-rolling and forging — The whole range of flat products — Merchant bars and sections — Wire-rods — All parts for rolling stock — Track material — Special pig irons and steels — High yield strength steels — Diesel engines from 200 to 25,000 hp — Line and shunting locomotives — Complete steam power plant — Equipment for nuclear power projects — Vessels of all types, motor or turbine driven, etc...

It is indispensable wherever a cheap source of motive power and a machine with reduced floor-space are required.

The 175 C.O. type engine has been designed so as to combine the qualities of robustness, long life and low running costs of the slow-speed heavy engines with the advantages of light-weight, reduced floor-space occupied and low purchasing costs of the high-speed engines.
The 175 C.O. type engine, such as it is designed and built, shows all these advantages.

— square engine with light connecting rod system and moderate speed,
— crankshaft rotating in roller bearings with crankcase-tunnel: perfect rigidity of the assembly,
— overhead camshaft: accurate control of the valve movements,
— large-capacity water pump: even temperature in the cylinder blocks and cylinder heads,
— double oil sump and double oil pump : contact minimized between oil and combustion gas, longer life for the oil bath,
— high rigidity of the cylinders and high water pressure: no cavitation, no erosion,
— all auxiliaries are gear-driven: no chain, no belt,
— the filtering of fuel, oil and air is of the highest efficiency,
— the Ricardo Comet V pre-combustion chamber permits the use of low grade fuels.

Whichever is the problem you are faced with, a 175 C.O. type engine is the solution.

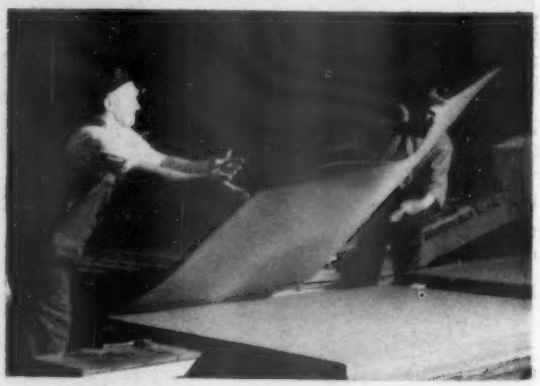
Apply to our Departments; their specialists will help you efficiently.

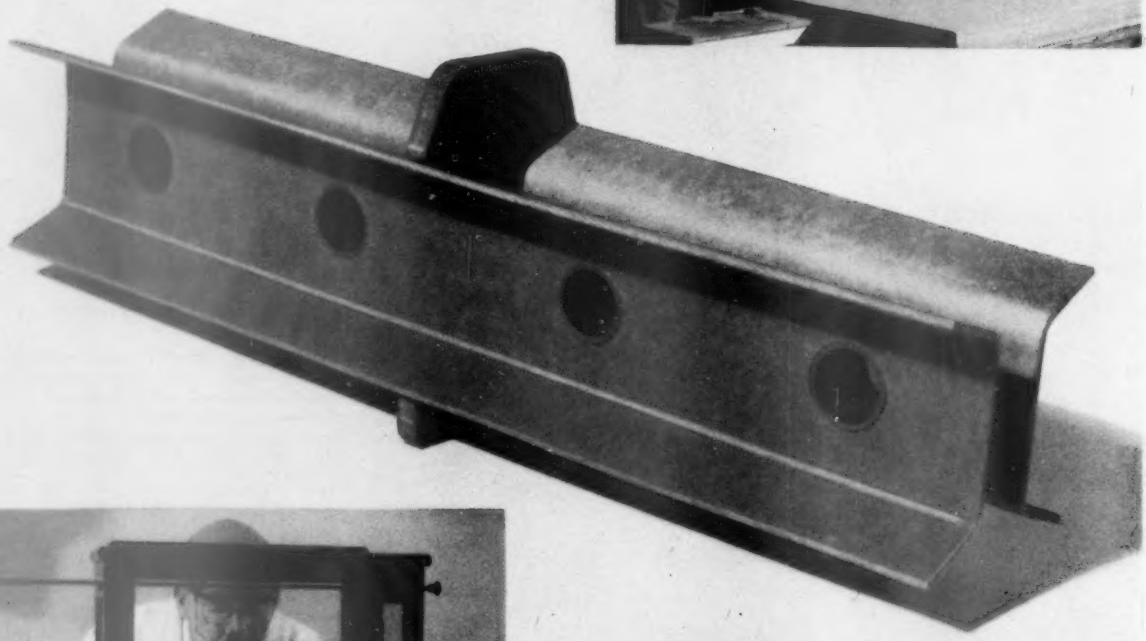
SERAING **COCKERILL-OUGREE** Belgium

C18/603

ALL ALONG THE LINE—

IT'S Castle FIBRE





TRACK INSULATION

Specially made to British Standards and Tested for Quality Throughout.

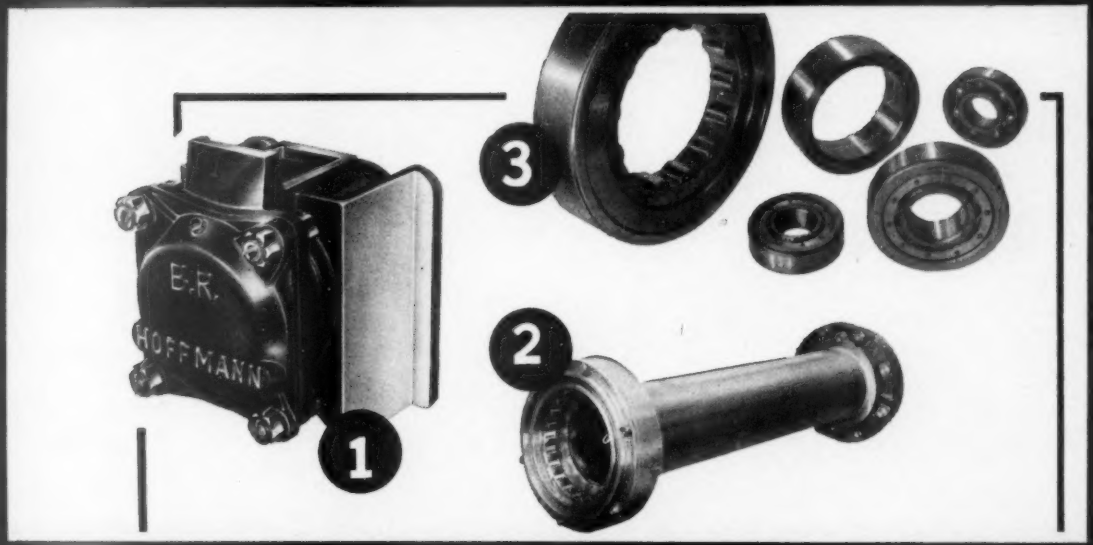
Vulcanised Fibre Ltd

BROADFORD MILLS GUILDFORD ENGLAND

PHONE: GUILDFORD 5214-7 GRAMS: VULCANISED, GUILDFORD

TELEX: 8529

Designed to meet the demands of Railway Progress...



1 HOFFMANN PARALLEL ROLLER BEARING AXLEBOXES for all types of rolling stock and locomotives . . . are of great durability . . . are quickly and easily mounted/dismounted . . . will run hundreds of thousands of miles without more attention than occasional, economical, quick lubrication.

2 HOFFMANN ROLLER BEARING TRACTION MOTOR SUSPENSION UNITS give service-free long running to electric stock and diesel electric locomotives, reduce gear and pinion wear, and entirely prevent axle-journal wear.

3 HOFFMANN BALL AND ROLLER BEARINGS used in a variety of types and sizes of diesel and electric locomotives — motors, generators, gear boxes, and ancillary equipment.

HOFFMANN
BALL AND ROLLER
BEARINGS

THE HOFFMANN MANUFACTURING CO. LTD. (P.O. BOX 7) CHELMSFORD ESSEX

Telephone Chelmsford 3151 Telex No. 1951

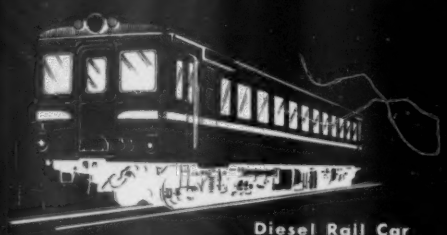
MITSUBISHI means

240-ton Transformer-Transport Car
– Largest in the world for narrow gauge –

920 H. P. 45-ton Diesel Hydraulic Locomotive

MAIN PRODUCTS

- DIESEL-ELECTRIC, HYDRAULIC, & MECHANICAL LOCOMOTIVES
- ELECTRIC LOCOMOTIVES, STEAM LOCOMOTIVES
- DIESEL RAIL CARS ELECTRIC CARS
- FREIGHT CARS, TANK CARS, TRUCKS
- DIESEL ENGINES, AIR BRAKES



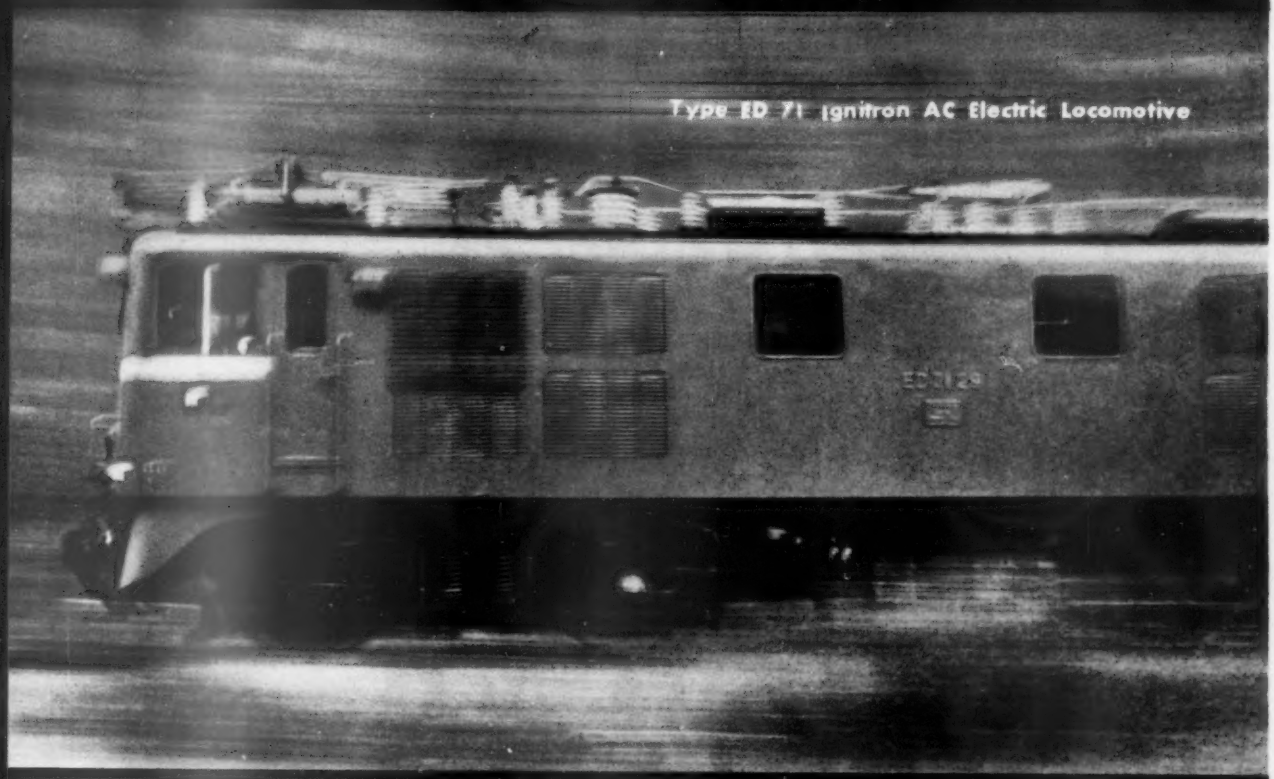
Diesel Rail Car

SHIN MITSUBISHI

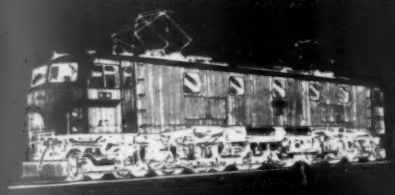
MITSUBISHI HEAVY-INDUSTRIES, REORGANIZED, LIMITED

Head Office : No. 10, 2-chome Marunouchi, Tokyo Cable Address : HISHIJU TOKYO

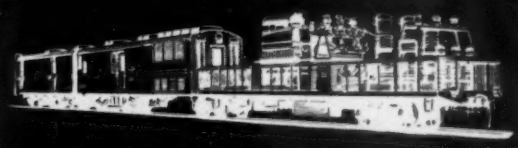
Quality Plus Integrity



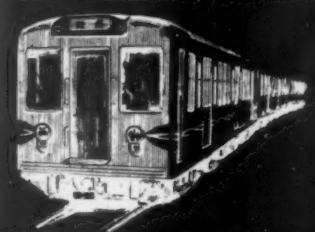
Type ED 71 Ignitron AC Electric Locomotive



Type EF-58 118-ton
DC 1,500v 1,900kW Electric Locomotive



3,000kW Portable Ignitron Rectifier Unit Substation



Newest Electric Cars for Tokyo Subway

MAIN PRODUCTS

- AC, DC, AC-DC ELECTRIC LOCOMOTIVE
- DIESEL ELECTRIC LOCOMOTIVE
- NEWEST ELECTRIC CARS
- TROLLEY COACHES COACE COACHES
- ELECTRIC EQUIPMENT FOR RAILWAYS
- AIR BRAKE EQUIPMENT FOR RAILWAYS
- SUBSTATION APPARATUS FOR RAILWAYS

MITSUBISHI ELECTRIC MANUFACTURING COMPANY

Head Office: Tokyo Building, Marunouchi, Tokyo Cable Address: MELCO TOKYO

TWO NAMES ONE AIM

THE PLAN to install diesel locomotives throughout British Railways takes one more step forward with the liaison of two great names in the engineering world.

Seventy-six sets of engine transmission equipment, which include generators, traction motors and control equipment have been ordered from the Brush Electrical Engineering Co. Ltd. for British Railways Type 4 diesel electric locomotives. In conjunction with this, diesel engines of 2,500 h.p. will be supplied by Sulzer Bros. (London) Ltd. These are now being built in the workshops of Vickers-Armstrong (Engineers) Ltd. The knowledge and craftsmanship of these two organisations — Brush and Sulzer — are thus being combined to produce first class diesel electric locomotives in conjunction with British Railways.

BRUSH ELECTRICAL ENGINEERING COMPANY LIMITED · LOUGHBOROUGH · ENGLAND

A member of the Hawker Siddeley Group

If you're conveying

ANYTHING

ANY SIZE

ANY DISTANCE

ANY PLACE

OVERHEAD CONVEYORS · FLOOR CONVEYORS · CRANES · HOISTS · SKI-WRACKERS · GRABS · RUNWAYS

GEO. W. KING

WILL CUSTOM-TAILOR A CONVEYING SYSTEM FOR YOU ANYWHERE IN THE WORLD

KING

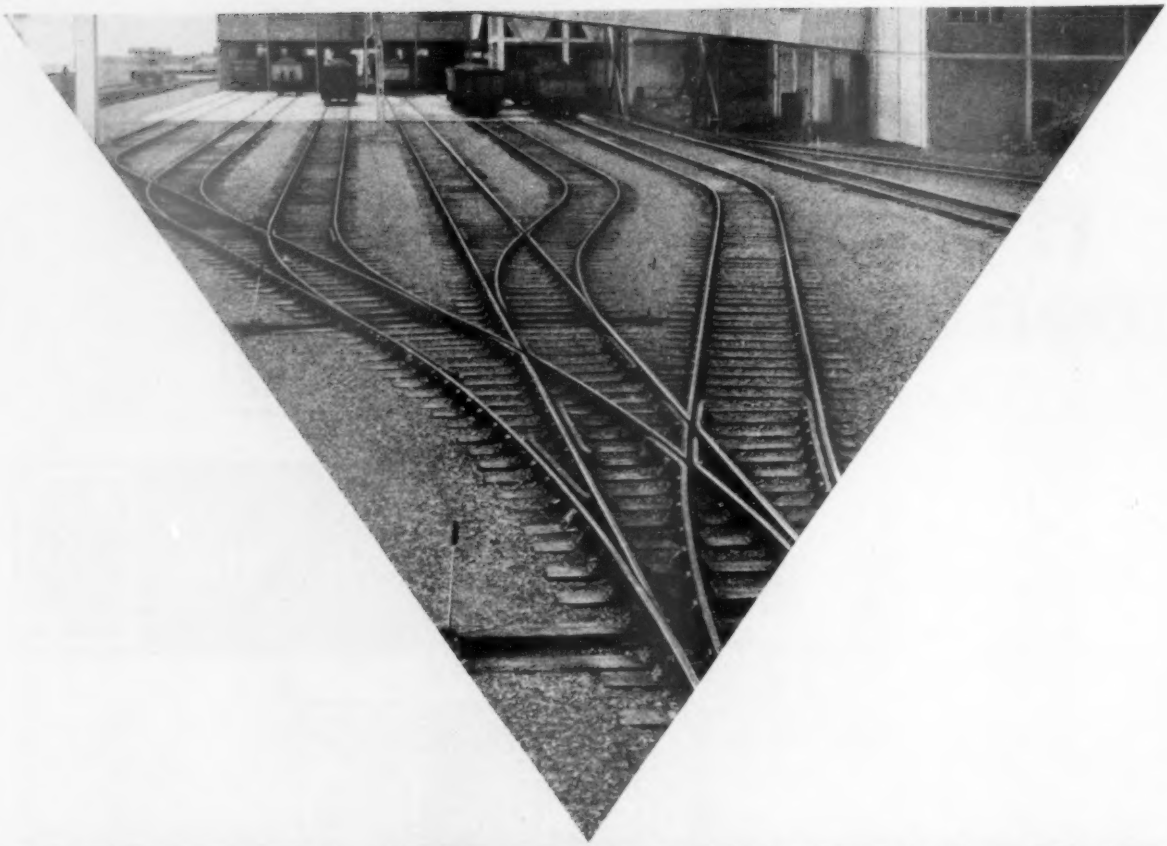
There is no product we cannot convey. KING'S have specialist groups to deal with small, medium, and large installations for *any*-sized product.

Just name your product and state your problem — GEO. W. KING will solve it the most economical way possible. And you'll get the benefit of KING know-how and experience — over 40 years — all over the world.

For further details and illustrated literature write or telephone:—

GEO. W. KING LTD Argyle Works · Stevenage · Herts. · Telephone: Stevenage 440

A KING representative will be pleased to call on you anywhere in the world.

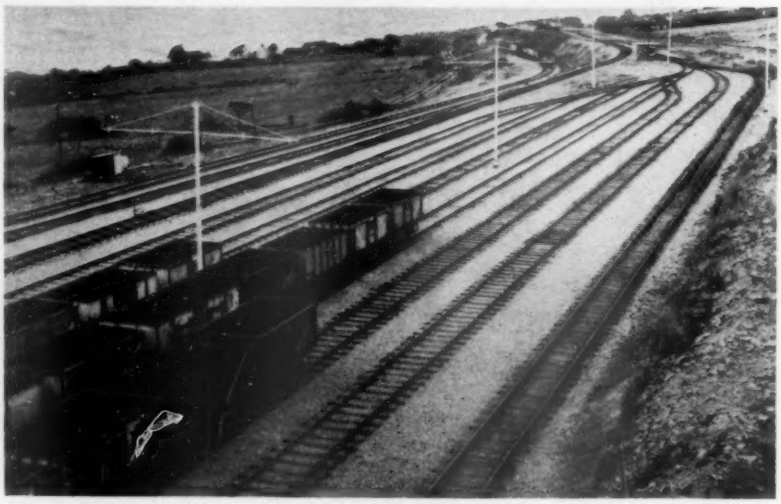


WARD-BUILT SIDINGS

at the New CYNHEIDRE COLLIERY · SOUTH WALES

With over sixty years experience WARDS install, maintain and design all types of industrial sidings. Today, their Rail Department's large specialised staff, backed by the resources of the Company, carries out numerous contracts concurrently, irrespective of location or size. WARDS, with their specialised staff can offer their services both as consultants and contractors.

Two free booklets—'Rails and Rail Accessories' (sixth edition) and 'Railway Sidings by WARDS' are available on request.

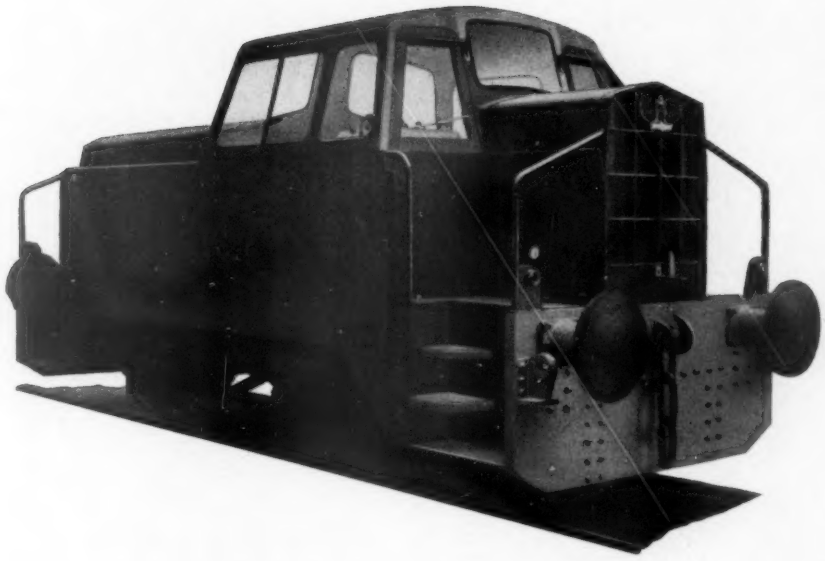


Photographs by permission of the National Coal Board

THOS. W. WARD LTD | **ALBION WORKS · SHEFFIELD**
Telephone: 26311 · Telex: 54-119

LONDON OFFICE: BRETTENHAM HOUSE · LANCASTER PLACE · STRAND · W.C.2. Telephone: Temple Bar 1515

SC. 70



Sentinel chose

Laycock-Knorr

BRAKING EQUIPMENT

View of cab interior showing dual driver controls.

The new Sentinel 34 ton 0-4-0 Diesel Hydraulic Industrial Locomotives now going into service are all fitted with Laycock-Knorr compressed air brake equipment and pneumatic sanding gear.

This equipment, together with various other types of railway vehicle braking apparatus used extensively on the continent and developed by Knorr-Bremse of Munich over the last half century, is now manufactured and offered by

Laycock
ENGINEERING LTD
Millhouses · SHEFFIELD 8

Member of the
Birfield Group

Complete Insulation with *Sprayed* LIMPET *Asbestos*

Why Sprayed LIMPET Asbestos ? Because it is the only insulation to combine : **INCOMBUSTIBILITY · HIGH THERMAL EFFICIENCY · EFFECTIVE SOUND ABSORPTION · ELIMINATION OF DRUMMING · LIGHTNESS IN WEIGHT CORROSION INHIBITION.**

30 years of continuous research and development have resulted in a product expressly adapted for the searching conditions of modern locomotives and rolling stock insulation.

Now, lighter coatings and improved equipment provide even greater efficiency at less cost and ensure that *Sprayed LIMPET Asbestos* retains its leadership in the insulating field.

Other J. W. Roberts Ltd. products for railways include

FEROBESTOS *asbestos reinforced plastics*

FEROGLAS *glass reinforced plastics*

LIMPET *asbestos based lining board.*

Also asbestos textiles, packings and jointings etc.

J. W. Roberts Ltd

A MEMBER OF THE TURNER & NEWALL ORGANISATION

Chorley New Road, Horwich, Bolton. Telephone: Horwich 840.
Branch Sales Offices: London, Glasgow, Birmingham, Leeds.

Talking about Production Tools Are you needing a single tool for a special job . . . or several hundred for a big production programme? You will find *all* the answers to your problems in the CP range. Every compact and powerful CP tool has been fully proved in tough service conditions like the new 3019 Nut runner shown above. It's reliable and efficient, designed for its job, and saves you money every moment it is used. If you want to put new impetus into production, switch to CP tools and watch work output soar! *Literature is available on request.*

✳ *REVERSIBLE SCREWDRIVER AND NUTRUNNER (CP 3019-ORSC-2000)* Features the adjustable ratcheting clutch. Screw tightness or torque varied by adjustment of tension of a spring which holds ratcheting jaws together. Provides impact tightening action at desired degree of torque, clutch jaws then engage and disengage until tool is removed. *Capacity: ¼" Machine Screws, No. 6 wood screws.*

Consolidated Pneumatic

Consolidated Pneumatic Tool Co. Ltd, Dawes Rd, London, SW6

CP265

ORMEROD

HEAVY DUTY SHAPING MACHINES

for high metal removal and sustained accuracy

★ *WITH RAPID POWER TRAVERSE*

★ *FIFTEEN RATES OF FEED*

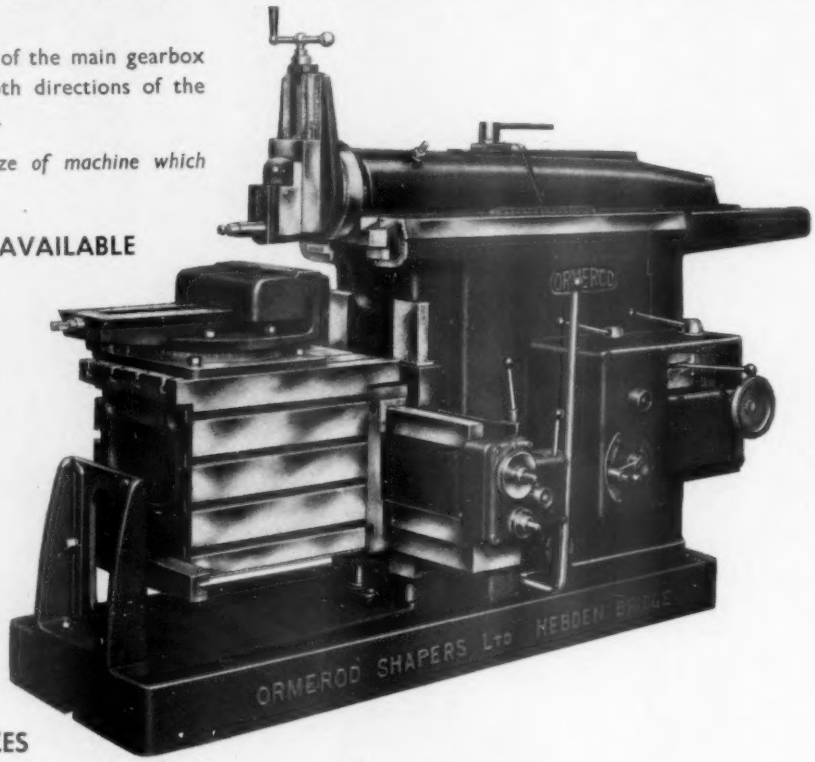
★ *AUTOMATIC PUMP LUBRICATION*

★ *SWIVELLING BASE VICE IS STANDARD*

The Ormerod range of Heavy Duty Shapers is based on 40 years' experience of reciprocating machine tools, resulting in machines of exceptional rigidity, thus ensuring full power to the tool without vibration, a heavy cutting capacity being combined with a high degree of accuracy.

Power traverse is an integral part of the main gearbox and provides rapid traverse in both directions of the table in addition to 15 rates of feed.

Write for further details of the size of machine which interests you.



ADDITIONAL EQUIPMENT AVAILABLE

Universal (Combined Swivelling & Tilting) Table

Swivelling Table

Deep Work Table

Automatic Feeds to Toolbox

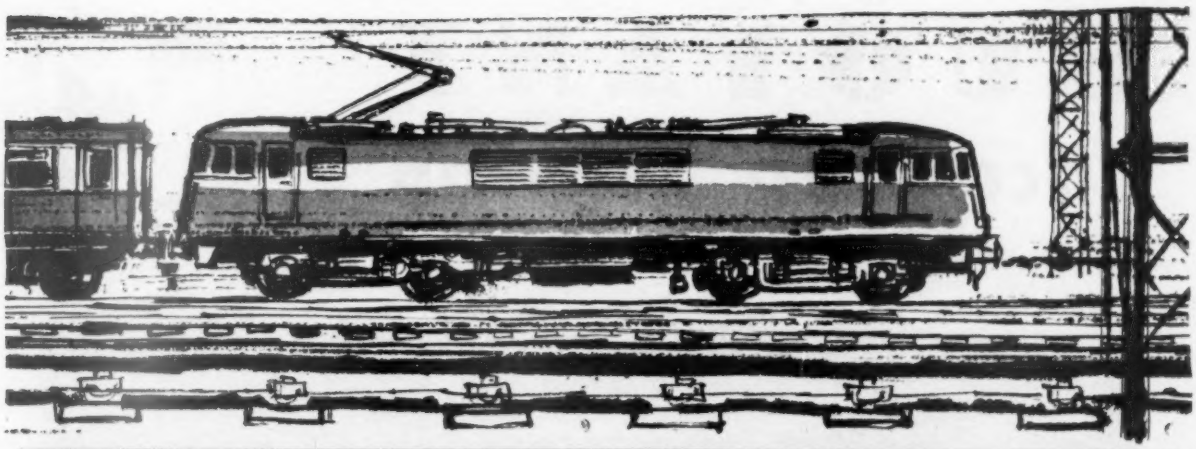
BUILT IN A RANGE OF SIZES

SIZE OF MACHINE	24"	26"	32"	36"
Horizontal Travel of Table ...	28"	30"	32"	35"
Length and Width of Table Top	26" × 18"	27" × 20"	29" × 20"	29" × 22"
Maximum distance Table to Ram	14"	14"	14"	14"
Rates of feed, horizontal	·01" to ·15"	·01" to ·15"	·01" to ·15"	·01" to ·15"
Rates of feed, vertical	·002" to ·03"	·01" to ·15"	·01" to ·15"	·01" to ·15"

ORMEROD SHAPERS LTD. *Member of the Asquith Machine Tool Corporation*

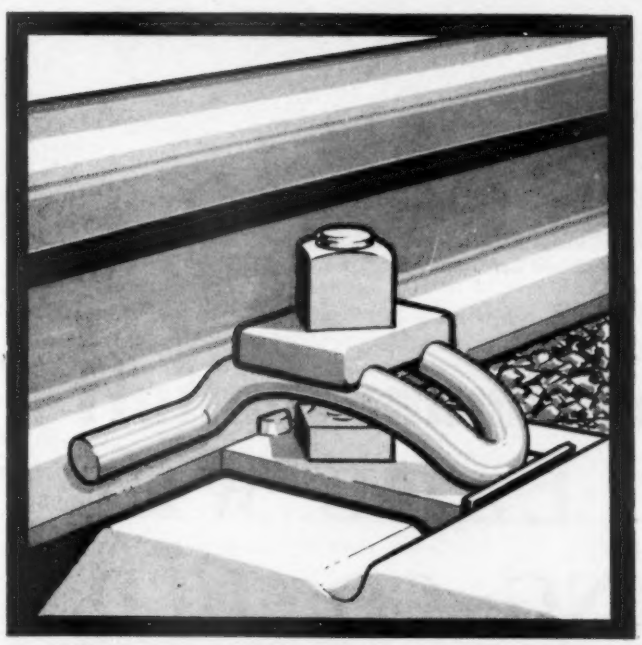
HEBDEN BRIDGE, YORKS, ENGLAND *Telegrams : 'Shapers', Hebden Bridge. Telephone : Hebden Bridge 17 and 313*

OS 376



KEEP TRACK

Today's 100 m.p.h. traffic makes big demands on the track. To help cope with this problem, Bayliss, Jones & Bayliss have developed resilient rail fastenings for use with concrete sleepers and long welded rails. Approved by the British Transport Commission, these tough spring steel fastenings are the latest additions to the BJB range, which still includes, of course, many traditional types of fastening.



BAYLISS, JONES & BAYLISS LIMITED

Head Office: Victoria Works, Wolverhampton. Tel: Wolverhampton 20441
London Office: GKN House, 22 Kingsway, London, W.C.2. Tel: CHA 1616

BJB GKN

D

BUOYANT
Lace Web Seating

(By kind permission of the Pullman Car Company Ltd., B.T.C.).

for maximum comfort

THE LACE WEB SPRING CO. LTD.

SANDIACRE near NOTTINGHAM

Phone: Sandiacre 2133 4-5

THIS ILLUSTRATION SHOWS BUOYANT LACE WEB SEATING IN PULLMAN CAR SECOND CLASS STOCK. MANUFACTURED FOR THE PULLMAN CAR COMPANY LTD., BY METROPOLITAN-CAMMELL CARRIAGE AND WAGON CO. LTD.

1000% faster load-selection helps *Mirrlees* speed B. R. Dieselisation

World-famous pioneering Diesel engine builders, Mirrlees, Bickerton & Day Ltd., Stockport, are busily engaged producing 226 Diesel engines to power Locomotives for the B.R. modernisation programme.

Over 50 years young, with a modern vigorous outlook, Mirrlees chose "Mechanised Muscle" to speed handling and storage, and to utilise existing store-space to their greatest advantage.

With a discriminating use of modern, Lansing Bagnall trucks, Mirrlees ....

..... Almost doubled the volume of stores in the Machine Shop Pool

..... Cut load-selection time from 30 mins. to 3 mins. (1000% faster)

..... Saved almost ¼ of the floor space in General Stores

..... and cut handling labour by half.

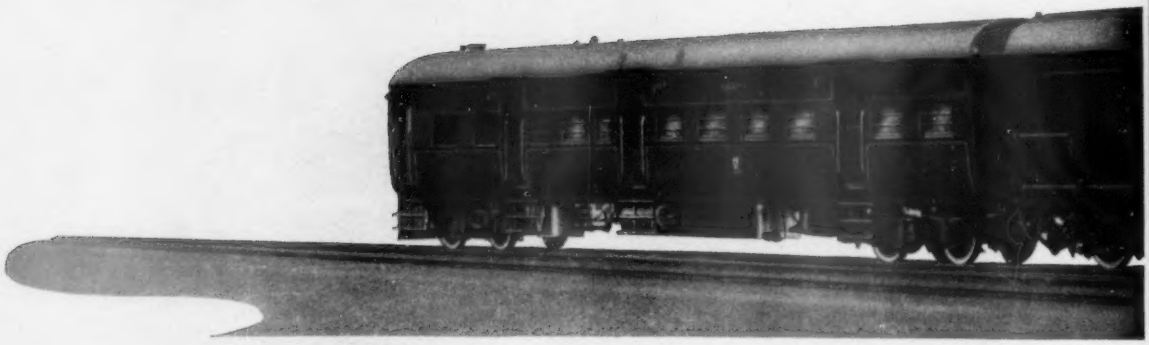
MECHANISED MUSCLE REGD.

Lansing Bagnall

BASINGSTOKE · HAMPSHIRE · ENGLAND
TELEPHONE - - - BASINGSTOKE 1010
TELEGRAMS - - BAGNALLIC, BASINGSTOKE

And at: Bristol; Cardiff; Glasgow; Leeds; London; Solihull; Portsmouth; Warrington; Paris; Sydney; Toronto; New York; Cleveland; Dallas, Oregon; and Zurich, and represented throughout the world.

SPACEMAKERS TO WORLD INDUSTRY

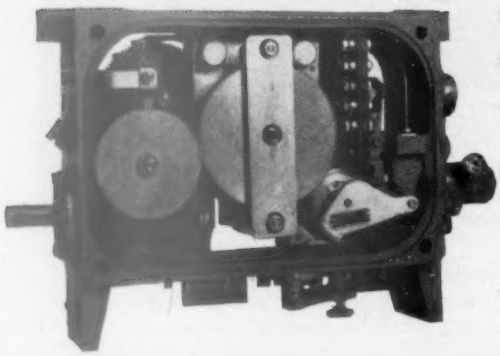


The Nigerian Railway Corporation have recently put into service two of these Twin Unit Diesel Railcars, supplied by the Drewry Car Co. Ltd., and built by Birmingham Railway Carriage & Wagon Co. Ltd. Each unit is fitted with Metcalfe-Oerlikon Patent Safety & Vigilance Control Equipment.

ANOTHER INSTALLATION OF THE

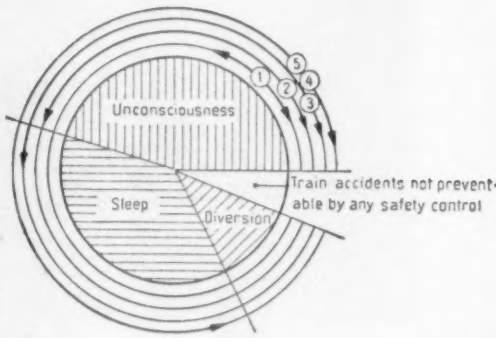
D & M

Automatic Safety &



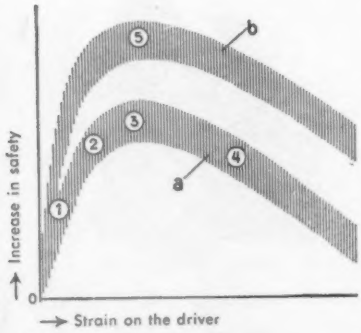
View of the safety side of the apparatus with the covers removed.

1 Normal Deadman's pedal.
2 Encased pedal for instep.
3 Sewing machine type pedal.
4 Pedal which must be periodically released.
5 Normal Deadman's pedal connected with the PATENT SAFETY and VIGILANCE CONTROL SYSTEM.



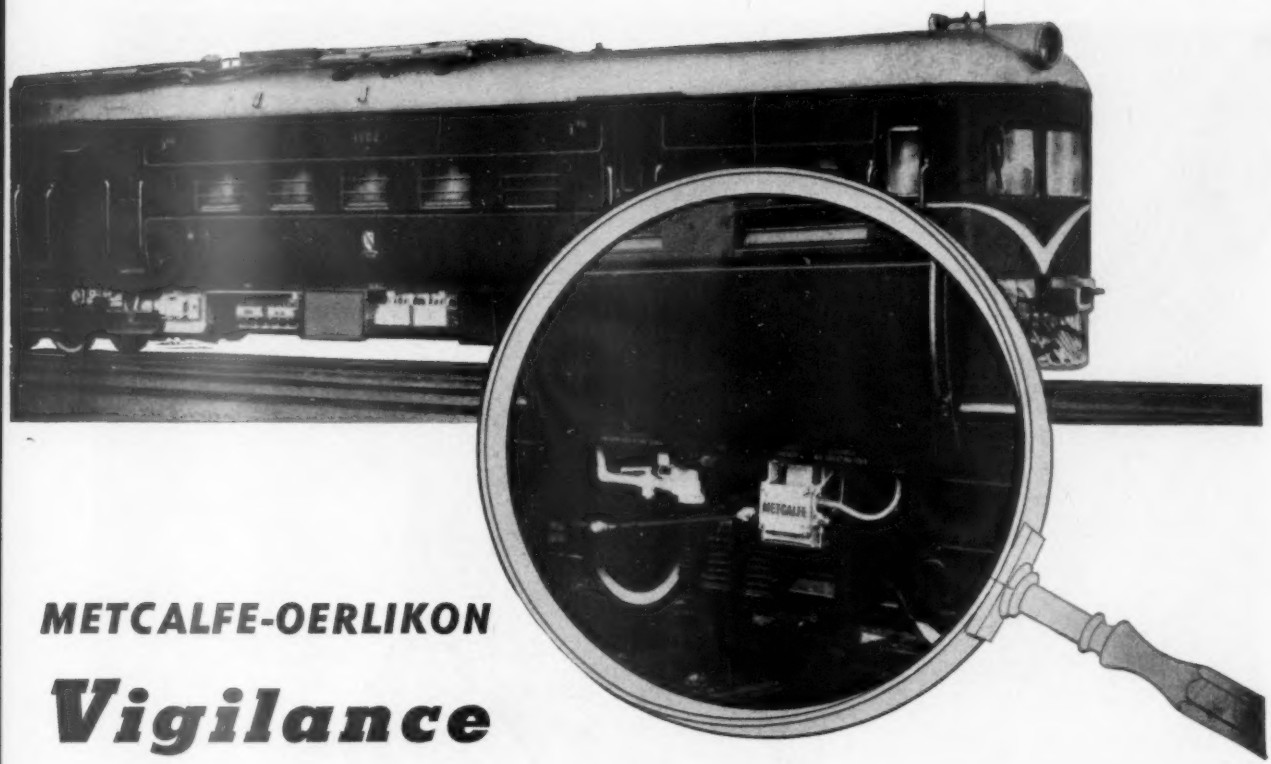
a Range of existing safety controls with pedals.
b Range of the Metcalfe–Oerlikon safety control.
1-5 Various pedal arrangements as fig. 1.

THESE CHARTS ILLUSTRATE THE SUPERIOR CONDITIONS AND RANGE OF SAFETY OBTAINED FROM THE SAFETY AND VIGILANCE CONTROL SYSTEM.



For full description write for leaflet A.41

DAVIES & METCALFE LTD.



METCALFE-OERLIKON

Vigilance

Control System

The Metcalfe-Oerlikon patent Safety and Vigilance Control System is wholly British made and provides a reliable and simple protection against the Driver becoming inattentive or failing to carry out his duties for any reason whatsoever. The equipment operates on a distance cycle and possesses a number of important features and advantages, further the reliability and effectiveness of this system has been well proved in widespread service on railways for more than twelve years.

The Patent Safety and Vigilance Control System is robustly made and embodies the maximum number of safety features in addition to being completely foolproof in operation. It is now fitted to a very large number of locomotives operating under a wide range of service conditions on railways throughout the world.

A particularly important feature is the automatic cancellation of the equipment by the Driver's normal operation of his controls, including the Master Controller, Brake Valves, etc. This arrangement together with operation on a distant cycle relieves the Driver of distraction or additional responsibility whilst at the same time providing the maximum range of safety. The equipment which has proved to be very popular with Drivers is easily fitted to new or existing locomotives and is suitable for use with all types of Brake Equipment.

INJECTOR WORKS · ROMILEY · ENGLAND

Telephone: WOODLEY 2626 (2 lines) • *Telegrams: EXHAUST, ROMILEY*

RG11

There are still a few forms of transport in which

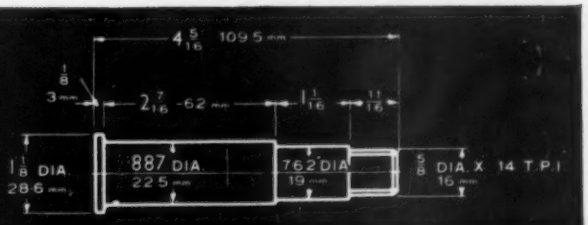
BROWN BAYLEY STEELS

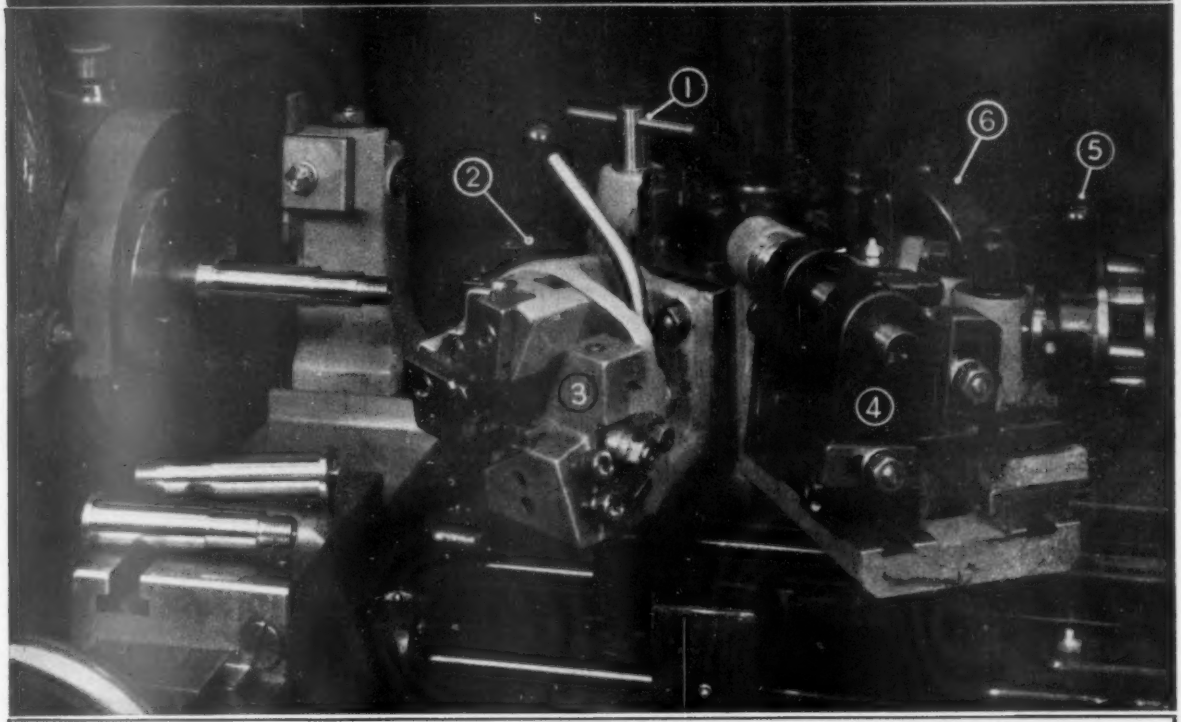
do not play an important part

BROWN BAYLEYS

BROWN BAYLEY STEELS LIMITED • SHEFFIELD

Ward SPECIAL TOOLING LAYOUT No. 11





STEEL SPINDLE

1 3/16" dia. Steel Bar E.N.8. 40 ton Tensile Steel Tungsten Carbide Cutting Tools.

2DS CAPSTAN LATHE

Code Word : **Twods**

Fitted with 1¼" Air Bar Chuck and Air Bar Feed.

Floor to Floor Time : 1 min. 45 secs.

DESCRIPTION OF OPERATION	Tool Position		Spindle Speed R.P.M.	Max. Cutting Speed		Feed	
	Hex. Turret	Cross-slide		Feet per min.	Metres per min.	Cuts per inch	m/m. per rev.
1. Feed bar to stop & close chuck	1	—	—	—	—	—	—
2. Centre drill	1	—	1110	—	—	Hand	Hand
3. Start turn	2	—	1110	343	104	Hand	Hand
4 Tangential roller turn ·887" dia.	3	—	1110	343	104	130	·195
5. Multiple roller turn 1⅛", ·762" & ·579" dias.	4	—	1110	343	104	130	·195
6. Thread roll ⅝" × 14 t.p.i.	5	—	1110	181	55	—	—
7. Roller end and chamfer	6	—	1110	181	55	Hand	Hand
8. Tangential part off	—	Rear	1110	327	100	Hand	Hand

'PRELECTOR' Combination Turret Lathes with Preselective speed-changing.

TURRET LATHES with capacities up to 35 in. swing over bed

1¼ in. to 2½ in. 'D-S' DOUBLE-SLIDE Capstan Lathes for heavier accurate work.

Stock Tools, Toolholders, Chucks and Accessories for Capstan and Turret Lathes.

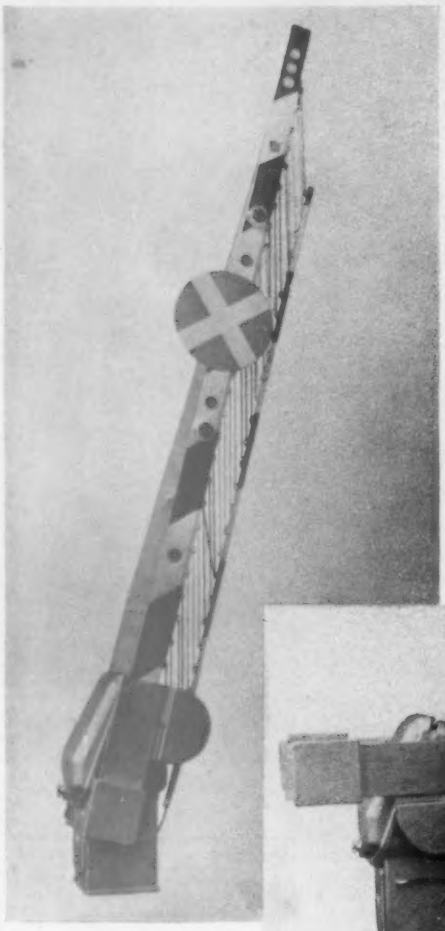
H. W. WARD & CO LTD
SELLY OAK, BIRMINGHAM 29
Phone: Selly Oak 1131

ASSOC. BRITISH MACHINE TOOL MAKERS ABMTM LTD

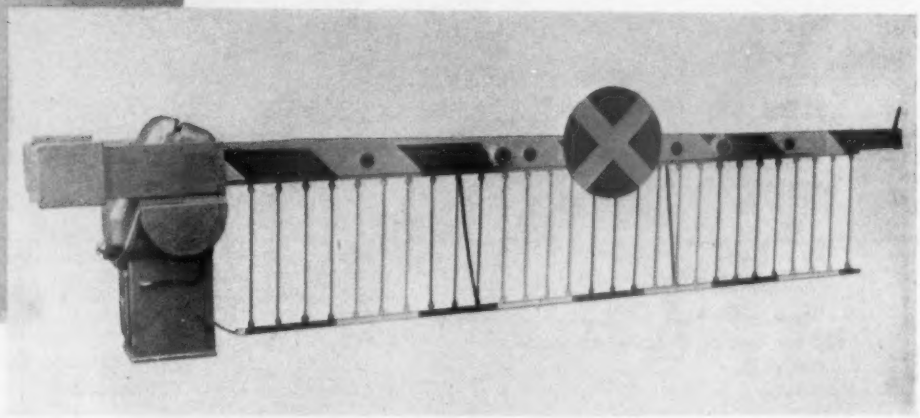
W684-1A

INTEGRA SIGNALLING

Fully Automatic Lifting Barriers



Our first fully automatic lifting barrier scheme in this country has now completed 2 years successful operation...



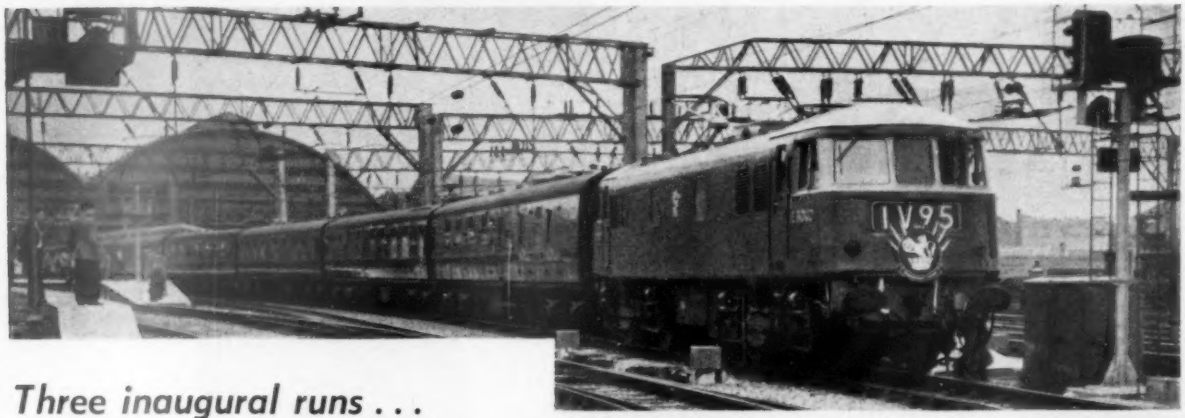
Full width barriers for local and remote control, and half barriers for automatic control, in accordance with M.O.T. Specifications for Railway and Industrial use. Operation from 24v. D.C. or local A.C. supply.

HENRY WILLIAMS LTD
Telephone : RICKMANSWORTH 4321

HWD

ELECTRIC SIGNALLING DEPARTMENT
WATFORD

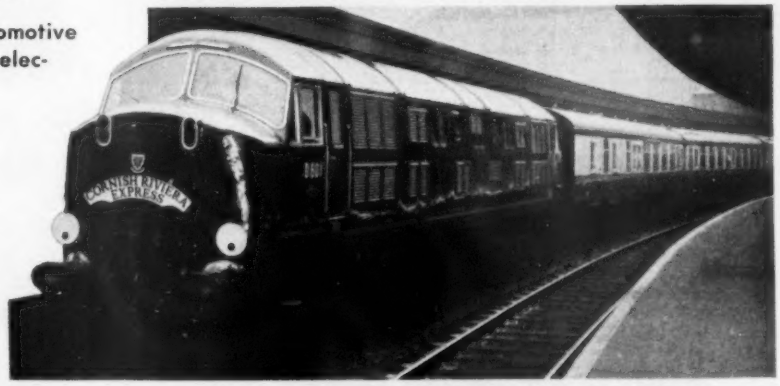
NBL *Locomotives*
OF THE NEW ERA



Three inaugural runs . . .

1. **A North British built Electric Locomotive hauls the first train on the newly electrified Manchester-Crewe route.**

   Main Contractor :—The General Electric Company Limited of England.

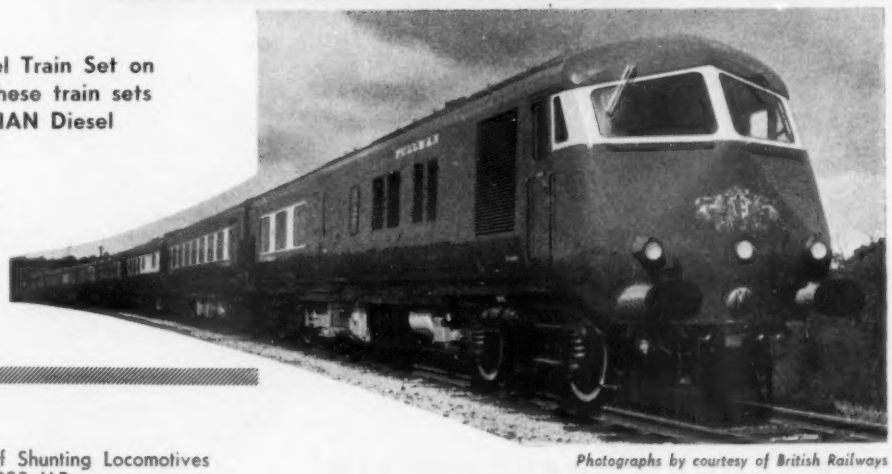


2. **A North British Diesel-Hydraulic Locomotive leaving Paddington with "The Cornish Riviera" to inaugurate the diesel service.**

   Powered by NBL/MAN Diesel Engines and Voith/NBL Transmissions.

3. **The first Pullman Diesel Train Set on British Railways. All these train sets are powered by NBL/MAN Diesel Engines.**

   Main Contractor :— Metropolitan Cammell Carriage & Wagon Co. Ltd., with electrics by The General Electric Co. Limited.



We also produce a range of Shunting Locomotives from 200 to 900 H.P.

Photographs by courtesy of British Railways

NORTH BRITISH LOCOMOTIVE CO. LTD., GLASGOW

LONDON OFFICE : Locomotive House, Buckingham Gate, S.W.1

E

In your hands

POWER TO STOP!

MOST Railway Rolling Stock, at home and overseas, relies on

VACUUM BRAKES

THE VACUUM BRAKE CO. LTD.

VICTORIA WORKS,

MILLHOUSES, SHEFFIELD 8

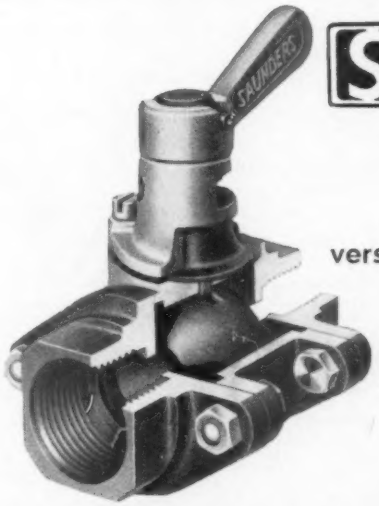
Member of the **Birfield Group**

SAUNDERS VALVE CO. LTD.

developed the

SPHERICAL PLUG VALVE

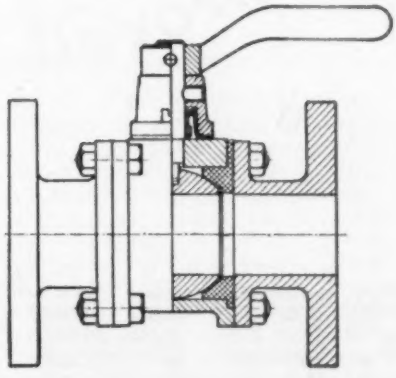
eighteen years ago. Since then this valve has kept British aircraft flying, served in various systems aboard ships, assisted with laboratory fluid control, simplified the handling of many difficult fluids - - - and continues to make its mark in industry generally.



SAUNDERS

M VALVE

– the established industrial version of the Spherical Plug Valve

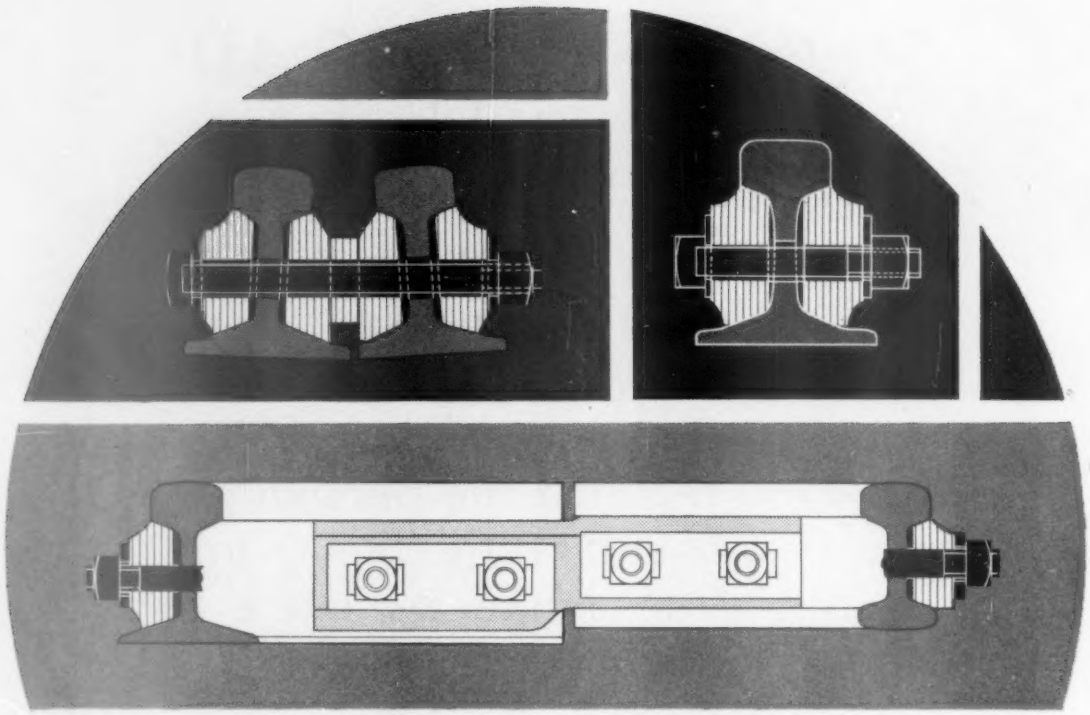


Quick Acting, straight and full bore with flexible seats that tighten their seal as fluid pressure rises. A sleeve diaphragm prevents spindle leakage.

SAUNDERS VALVE COMPANY LIMITED

DIAPHRAGM VALVE DIVISION

CWMBRAN · NEWPORT · MONMOUTHSHIRE · Telephone: CWMBRAN 3081-9



used and proved all over the world

PERMALI insulating fishplates

Over 400 Standard patterns for every size and type of rail. Proved in practice on all kinds of tracks, with the heaviest axle loadings, in every climate, for over 25 years.

PERMALI LIMITED · GLOUCESTER · ENGLAND *World wide agency representation*

The

RAILWAY GAZETTE

INCORPORATING: THE RAILWAY ENGINEER • TRANSPORT • THE RAILWAY NEWS • THE RAILWAY TIMES • RAILWAYS ILLUSTRATED
HERAPATH'S RAILWAY JOURNAL (ESTABLISHED 1835) • THE RAILWAY RECORD • THE RAILWAY OFFICIAL GAZETTE

A journal of Management, Engineering and Operation

VOL 115 FRIDAY JULY 21 1961 No. 3

CONTENTS

	PAGE
Editorial notes	61
Setback to U.S.A. railways	63
Government plans for N.Z.G.R.	63
Electrification in India	64
Irish summer train services	64
New basis for management control	65
Letters to the Editor	66
The scrap heap	67
Overseas railway affairs	68
Diesel-hydraulic locomotives for the Western Region	69
Polyester laminate production in Derby Works	72
New station for Mufulira	74
Two-way double-track operation in Victoria	75
Personal	77
New equipment and processes	79
Accident report—collision at Castlecary	80
News articles	82
Contracts and tenders	85
Notes and news	86
Railway stock market and official notices	88

Editor: B. W. C. Cooke, Assoc. Inst. T.

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telephone: WHitehall 9233 (24 lines)
Telegrams: "Trazette Parl London"
Overseas telegrams: Trazette, London, S.W.1

MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

BRANCH OFFICES

GLASGOW: 139, Bothwell Street, C.2 ... ... *Central 4646*
NEWCASTLE UPON TYNE: Cathedral Buildings, Dean Street, 1 *Newcastle upon Tyne 22239*
MANCHESTER: Century Insurance Building, St. Peter's Square *Central 7667-8-9*
BIRMINGHAM: 90, Hagley Road, Edgbaston ... *Edgbaston 2466—3728—3732*
LEEDS: 70, Albion Street ... ... *Leeds 27174*
BRISTOL: 20, Victoria Square, Clifton ... ... *Bristol 33873*

Annually £5 by post Single copies, two shillings
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Higher pay for railwaymen

THE British Transport Commission has agreed to meet the three railway unions on August 21 to discuss their pay claims on behalf of 440,000 railwaymen. The unions first lodged their claims in May. The National Union of Railwaymen wants a "substantial" wage increase, and the Associated Society of Locomotive Engineers & Firemen is seeking a 10 per cent rise. The Transport Salaried Staffs' Association is less specific and wants to maintain the differentials for its members established by the Guillebaud pay settlement last year, under which railwaymen were awarded increases ranging from 8 to 20 per cent. The three unions still have to settle with the Commission the question of shorter hours—a reduction of four hours a week was asked for, to which request the Commission replied with an offer of a two-hour reduction. This offer was accepted by the N.U.R. and A.S.L.E.F.—T.S.S.A.'s attitude is given in detail on page 84. Although, in view of the overall indeterminacy of the unions' demands, it is impossible to estimate the effects of their full or partial success, a rough idea can be gained of the cost to the Commission of the 2-hr. reduction in hours, if this were applied throughout the structure. At present, the annual wages and salaries bill is £365 million: a 2-hr. reduction in hours would represent approximately one-twenty-second of this amount: that is, some £15 million. If in addition A.S.L.E.F.'s claim for a 10 per cent rise were to be applied throughout, the additional cost would be some £36 million. Taken together, therefore, the two increases would add some £51 million to the annual wages bill, bringing this to some £416 million. As the general position of the railways has already caused the necessity for a supplementary estimate for £27 million to be submitted to Parliament, it seems unlikely that the unions will receive a favourable response to their new demands.

Government policy

THE announcement that a meeting will take place between the unions and the Commission at this date gives added interest to the Government's intentions to deal with the economic position which the Chancellor of the Exchequer is expected to announce in the House of Commons next Tuesday. General economic thought in the country at the moment is that there is a grave need for the Government to give a lead through the nationalised industries to ensure a period of wage stability. It may be unfortunate that the railway claim will be among the first to test the strength of the Government in so vital a matter. In the past, the railway unions have been in the van of a cycle of wage claims and, on more than one occasion, the actual gains that have been achieved have not been as great as those of other important unions which have succeeded them. It is an unfortunate element in railway wages that they have a direct effect on costs of transport which in turn are reflected throughout practically all sections of manufacturing activity.

Meeting the demand

AMONG all the prejudiced and unjust criticisms of British Transport Hotels & Catering Services one legitimate and reasonable requirement has been voiced for some while past. This is that there should be some type of tray refreshment available for families proceeding on holiday in numbers which would entail considerable cost were all to partake of a set meal in a refreshment car. To meet this demand, the Service last year introduced light refreshments, served from specially-built trolleys or trays, and avajlable on those long-distance trains on which the demand does not justify a restaurant or buffet car. The trolley service has produced such encouraging results during the summer and winter since its introduction that the number of trains on which refreshments will be available on the London Midland Region has been increased by 25 per cent. This summer, the trolley service will be available on 72 London Midland holiday trains.

The human aspect

IN HIS 1961 Nuffield lecture to the Institution of Production Engineers at Bristol on June 14, Sir Willis Jackson, Director of Research & Education of Associated Electrical Industries

(Manchester), said that too little recognition had been given to the fact that no new idea could be translated from the laboratory and design office into large-scale production without the supporting skill and resource of a much larger body of technicians, craftsmen, and operatives, and that the satisfactory education and training of these was no less vital to the successful operation of industry than that of scientists and technologists. This is a fact which has always received consideration in enlightened railway circles both in this country and abroad, but which is receiving very close attention today, in view of the far-reaching changes which are accompanying the changeover from old to new forms of traction. An example of British Railways' attitude on the question was given in the paper of Mr. G. A. V. Phillips, Divisional Traffic Manager of the Western Region, to which editorial reference was made last week. Other railway systems which present themselves quickly to mind in this connection are those of India, Rhodesia, and East Africa.

Rail development for Israel?

THE World Bank and Dead Sea Works Limited (Mifalei Yam Hamelah B.M.) of Israel have signed an agreement for a loan equivalent to $25 million to help finance an expansion of the company's production facilities at Sodom at the south end of the Dead Sea. The largest expansion will be in the production of potash: present production of about 150,000 tons will be increased to nearly 600,000 tons annually. This is the figure reported in our Overseas Railways Affairs section of April 7 to have been required at that time by the Israel Government before it was ready to construct approach roads and a rail extension to Eilat, Israel's port on the Red Sea. Earlier, in the same section in our March 17 issue, we recorded the Israel Government's interest in the project to the extent that the Ministry of Transport was examining a study made on the subject some four years ago by the representative of a foreign construction concern. The cost of laying a railway line from Beersheba to Eilat—the scheme under review—was estimated in the order of I£50-I£60 million.

Railway finances in Pakistan

BEFORE 1959 the two railways in Pakistan, then known as the North Western and the Eastern Bengal, were managed as a Government Department under a Director-General of Railways, and demands for railways were presented as part of the general budget of the country. It became increasingly obvious that this organisation was unsuitable for a commercial enterprise of the size and importance of Pakistan Railways, and that reorganisation was imperative. The first step taken toward this end was the establishment of a Railway Board with full powers in internal day-to-day management, but subject to overall control by the Government in matters of policy. The first Railway Board came into being on August 31, 1959. The second step took the form of the separation of railway finances from the general finances. As a result a pro-forma railway fund was created with effect from the financial year ended March 31, 1961, pending acceptance of an *ad hoc* contribution to general revenues. Subsequent settlement of this matter has enabled the Government to adopt separation as from 1961–62.

Future role of the railways

THE fifteenth edition of "*L'Année Ferroviaire* "—an annual publication which never fails to make a notable contribution to the store of railway literature—contains its regular statistical and technical section, of world-wide scope. This is preceded by a selection of articles and essays which present the railway scene in France and elsewhere in many aspects. This year the opening article by M. Maurice Lemaire, Directeur-Général Honoraire of the S.N.C.F., on the rôle of railways in post-war Europe, is an invigorating reply to the conversionists. Far from seeing a progressive decline in the economic importance of the railways, he expects new demands to be made on them, and looks ahead to co-ordinated developments between the systems of the European and African continents as the road to the free exchange of goods and services and the lowering of prices. Following this is a detailed account by M. Henri Lefort, Regional Manager, Région de l'Est, of the Est-Paris electrification, covering both the inception and growth of the project and its future organisation. Other subjects covered this year are modern mining railways, with special reference to the trans-Mauritania line from Fort-Gouraud to Port-Etienne, the tourist industry and the railways, and the establishment of a centralised electronic data processing system for the whole of the S.N.C.F. The information in the second half of the book covers events up to the winter of 1960. Of British Railways it is said that " the future may well show 1960 to have been a decisive turning point," and it is clear from the context, which deals with electrification and the growing volume of diesel motive power, that this turning is expected to lead to a future of growing service to the community.

Development at Mbizi

RHODESIA Railways is spending £70,000 on development at Mbizi, until recently a quiet little station on the South East line of the system some 75 miles from the Portuguese border at Malvernia. The development is to enable the station to handle the ever-increasing low veld sugar crop which is raised in the vicinity. Electrical and water reticulation, including boreholes, pumps, and tanks, will account for £28,000; station buildings will cost nearly £14,000, and permanent way and works will amount to £7,300. Land and surveys have cost £800. If special lorries for transporting the raw sugar in bulk are included, the whole cost of the scheme will be just on £108,000. The expansion follows a five-year agreement with Triangle Sugar Estates for transport of bulk sugar by Rhodesia Motor Services from the mills to the railway for onward transmission. Rhodesia Railways, and particularly the R.M.S., has played a big part in the recent low veld development schemes in the south east of the colony.

Collision at Castlecary

BLOCK irregularities by two signalmen were the main cause of the collision between an Up empty coaching stock train and an Up diesel express at Castlecary on September 2, 1960. This is made clear in Colonel Robertson's Report, summarised on a later page, but a contributory cause was the failure of the driver of the diesel train to apply his brakes as quickly as he should have done. Colonel Robertson had difficulty in disentangling the contradictory evidence given by the two signalmen. He held both responsible, but one to a much greater degree than the other. He pointed out that block controls, however comprehensive, did not relieve signalmen of the need for correct block working, but he recommended the installation of " Welwyn " control, not only at Castlecary, where it was being done, but at other points on this busy line. One of the signalmen concerned was only 20 years of age. Colonel Robertson did not criticise this except to point out that it rendered him more likely to concur in the irregularities of his older colleague. There was some delay in calling ambulances, and Colonel Robertson criticised the Castlecary Stationmaster in this respect.

Lifting barriers on British Railways

AN INTERESTING development noticeable on British Railways today is the installation of train-actuated automatic level-crossings. In recent weeks we have recorded two installations of the type—one at Spath near Uttoxeter and the other at Marston, a point on the busy cross-country route which links

the main lines of the Eastern, London Midland, and Western Regions. These automatic crossings will be extended throughout the country: their installation follows the formation of a strong body of transport opinion against conventional, manned crossings which involve British Railways in costs of over £1 million a year in operation and often cause considerable road traffic delays. In 1956, a party of officers from the British Transport Commission and the Ministry of Transport visited Holland, Belgium, and France to study latest Continental practice. After receiving the report of this party, the Minister of Transport was empowered to authorise special arrangements at level-crossings fitted with automatic or remotely-controlled lifting barriers. The installation at Marston cost about £7,000 and the London Midland Region expects to cover this in about four years in savings in staff costs.

Level crossings in South Africa

In South Africa the report of the National Transport Commission for the year ended March 31, 1960, stated that the Permanent Level Crossing Committee, meeting on February 3, 1960, discussed the proposed legislation for the establishment of a Level Crossing Elimination Fund. The proposal visualised the contribution of £250,000 annually by each of the three authorities, the Treasury, South African Railways, and the National Transport Commission. The committee also drew up a third list of priorities in readiness for the statutory body to be established in terms of the proposed legislation. Subsequently, Parliament enacted legislation to provide for the establishment of a fund and of a statutory Permanent Level Crossing Committee and to define its functions. This legislation was covered by the Level Crossings Act, 1960, and came into operation on April 1, 1960. The National Transport Commission's report is published jointly with that of the Department of Transport in South Africa.

Screw thread practice

The decision of the International Standards Organisation to issue recommendations for both unified inch and metric systems of screw threading was hardly a helpful one from the British point of view. Already faced with the near-certainty of having to make a change from Whitworth and B.A. threads, British industry is now in the unenviable position of having also to decide which of the two alternative systems is likely to gain the greater favour. The British Electrical & Allied Manufacturers' Association has had the problem under consideration for some years and, following the I.S.O. decision, carried out a detailed inquiry among individual member firms. This showed a substantial majority opinion that it would be desirable to maintain a common normal production practice within electrical and allied industries and that, when the time came to make a change, it should be to the I.S.O. metric thread. In the light of this opinion, B.E.A.M.A. intends to initiate discussions with major customer, trade, and Government interests with which it is concerned so as to seek to work out an acceptable long-term plan to give effect to future screw-thread policy.

Test run on S.N.C.F.

The second of the 2,000-h.p. c-c gas-generator locomotives of the French National Railways recently made a special test run from Paris to Caen with a trailing load of 820 *tonnes* on a fast schedule, though keeping within the maximum of 120 km.p.h. (75 m.p.h.) for that route. For many months now, the first unit, No. 060.GA.1, has been running in revenue service based on La Rochelle Depot, in the same link with 15 of the Alsthom 1,800-b.h.p. Co-Co diesel-electric locomotives, and in recent weeks the second locomotive also has been operating from La Rochelle. It will be recalled that these locomotives, built by Renault and A.F.L., with Sigma free-piston gas generators, have a simple two-speed mechanical transmission, and though the charge-speed gear has been much used daily, there was a good deal of interest in its behaviour on the special run to Caen with a much heavier train than normal.

Setback to U.S.A. railways

An editorial in our June 23 issue described the difficult position of American railways at the end of March. The A.A.R. statement of revenues and expenses to April 30 shows no improvement in the situation. For four months, operating revenues were nearly $392 million, or 12 per cent, less than in 1960. Freight receipts were down $358 million, 13 per cent, and passenger receipts $10·7 million, 5 per cent, while parcels traffic brought in $9 million less, a decrease of 26 per cent. The operating ratio rose from 79 per cent to 83·2, despite a cut in expenses of $182 million, or 7 per cent. Though taxes of all kinds were lower by $53 million, or 15 per cent, net railway operating income dropped by $166 million, over 78 per cent, to $45·8 million.

It was a pity that in April the Milwaukee was added to the number of railways in deficit because of a slight rise in its operating ratio to 85·4 per cent. It has always been an enterprising line and a deficit of $141,309 was a trifle compared with the New York Central lack of almost $19 million at April 30, and the $14·5 million needed by the Pennsylvania to break even, despite a 12 per cent saving in expenses. These great companies cannot pay their way with operating ratios of 98 and 88 per cent respectively. Slackness in the steel and coal mining industries deprives the railways of much tonnage which they are specially equipped to handle, so that in May wagon loadings still ran at the rate of 15 per cent below those of the lean year 1960. Yet the Norfolk & Western kept its operating ratio below 60 per cent in April and had the highest earnings of any U.S.A. railway.

Government plans for N.Z.G.R.

Sweeping plans announced by the New Zealand Government to improve the position of the railways in that Dominion are stated to aim at encouraging both "greater competition and more effective co-ordination with road transport." Greater competition would certainly seem to be ensured by the concessions to road transport relaxing restrictions on the cartage of goods where there is rail service. These include the complete freedom from restriction of the cartage of livestock, and an extension of the limit for goods carried in competition with the railway from 30 to 40 miles. On the other hand, road operators are to be encouraged "to feed to rail at main-line stations," though it is not stated how this is to be achieved.

In the streamlining of the Railway Departments operations and the closing of all uneconomic branch lines, it is stated that "the main users of these lines would be interviewed by railway officers, and the lines would not be closed until these users had had a reasonable time to make alternative transport arrangements." There is no suggestion of the provision of any alternative transport by the Government in lieu of the railways it is closing, and users other than the main users would not seem to be consulted.

The following are some of the lines that are definitely to be closed: Studholme-Waimate, Darfield-Whitecliffs, McNab-Waikaka, Hornby-Southbridge-Little River, and Mataura-Wyndham—short branches—and Milton-Roxburgh—a longer one—all in the South Island, and Ohakune-Raetihi in the North Island. There are numerous other uneconomic lines, the closing of which is under consideration.

Suburban passenger fares were increased on July 16. Users of 10-trip tickets are to pay from one-third to one-half more than before that date, but all-purposes tickets to be issued are to have "unlimited availability and transferability."

Charges for livestock carried over distances of from 52 to 175 miles are to be reduced, the reductions ranging up to 21

per cent. Railway tariff charges are to be progressively reviewed and greater emphasis is to be given to attracting business for the railways. Meanwhile, modernisation is to be continued in all its aspects. The various changes are stated to be aimed, primarily, at gearing the transport system to meet the changing demands of rapid development and to make it efficient and sufficiently flexible to thrive on healthy competition.

Electrification in India

BEFORE the end, on March 31, 1956, of the first five-year plan period, electrification in India was limited to the Central and Western Railways' suburban services in Bombay, and, on a smaller scale, the metre-gauge Madras suburban service of the Southern Railway. The route-mileage was then 246 miles, all on 1,500-V. d.c. supply. By 1958, a further 88 miles of the Eastern Railway from Howrah (Calcutta) had been electrified, still with direct current but at 3,000 V.

During that year important considerations were discussed as a result of the success of high-voltage a.c. single-phase 50-cycle traction in France and other countries. Local conditions and many other factors had to be taken into account by the Planning Commission. It was difficult to decide whether to retain the d.c. or launch out on the a.c. system, but the growing consensus of opinion in favour of the latter eventually prevailed, and it was adopted as the new standard for Indian Railways, using 25-kV. current.

Approval quickly followed to the electrification on the a.c. system of about 670 route-miles of line to be begun during the second five-year plan period on the Eastern and South Eastern Railways—mainly for the movement of iron ore, coal and other bulk materials in connection with the steel plants at Durgapur and Rourkela—and also for the Sealdah suburban services, Calcutta.

The section approved on the Eastern Railway was that part of the Calcutta-Delhi main trunk route, *via* the Grand Chord, from Durgapur to Moghalsarai, a distance of rather more than 300 miles. Over 100 miles from Durgapur to or beyond Gomoh on this line have now been electrified.

On the South Eastern Railway the sections approved for a.c. electrification were: (1) the Kharagpur-Tatanagar-Sini-Rajkharswan-Rourkela section of the Calcutta-Nagpur (the former Bengal-Nagpur Railway) main line, about 185 miles; (2) Asansol to Sini, some 100 miles; and (3) Rajkharswan to Dangoaposi, an iron ore deposit on the Gua branch. The Dangoaposi ore goes to Durgapur *via* Rajkharswan, Sini, and Asansol.

The Sealdah suburban electrification involves about 200 route-miles of the former Eastern Bengal Railway; this work is being undertaken in the third five-year plan period.

These electrifications, apart from the Sealdah suburban area, are increasing capacity of the various sections serving the older steel plants at Tatanagar and Burnpur, and the new ones at Durgapur and Rourkela. The finished products of these plants at present amount to about 4·5 million tons, and before the end of the third-plan period, when the Bokaro plant will also be in production, it is expected to be some 7·4 millions. As each ton of finished steel requires about 4½ tons of iron ore, coal, limestone, and other materials, the volume of this traffic moved by rail now and in 1966 is likely to approach 20 and 33 million tons respectively.

Until such time as more electric locomotives become available only goods and mineral trains will be hauled electrically. Double-headed steam and diesel-electric traction is still having to be used for the heavier trains on various sections of these two railways. Meanwhile, preparations are being made to build a.c. locomotives at Chittaranjan and a.c. multiple-unit stock at the Integral Coach Factory.

Power for the various electrified sections is being supplied by a number of independent supply authorities, such as the Electricity Boards of four States and private corporations, co-ordination being by the Central Water & Power Commission under the Ministry of Irrigation & Power. Close co-ordination is also necessary between the railways and the Post & Telegraphs Department, as speed of electrification depends frequently on that at which the telegraph and telephone lines alongside these railway high-voltage overhead-transmission installations can be completely replaced by screened underground cables.

Other sections of railway envisaged as likely to be undertaken or completed during the third-plan period are: Madras-Villapuram, Southern Railway; Igatpuri-Bhusaval, 190 miles of the Central Railway main line Bombay-Delhi and Calcutta (by two routes); and possibly Moghalsarai-Kanpur *via* Allahabad, Northern Railway, a distance of over 200 miles; also the 200 miles in the Sealdah suburban area, already in hand.

Irish summer train services

SOME important changes, which came into operation on June 12, have been made in the summer timetables of Coras Iompair Eireann. In previous summers the special diesel express leaving Dublin (Kingsbridge) at 8.55 a.m. for Killarney and Tralee has been non-stop over the 144·5 miles to Mallow; this summer there is a stop at Limerick Junction (10.53/10.55 a.m.), and the next stop is Killarney (12.31 p.m.); Mallow is omitted. Tralee is reached at 1.10 p.m. as before. The 6.45 p.m. diesel express from Kingsbridge to Cork omits its stops between Thurles and Limerick Junction, which are provided by starting at Thurles, at 8.40 p.m. the former 9.20 p.m. stopping train from Limerick Junction to Cork; the 6.45 p.m. reaches Cork 5 min. earlier, at 10.15 p.m.

A new express is provided on Sundays at 10 a.m. from Amiens Street to Cork (arriving 1.30 p.m.), calling only at Limerick Junction and Mallow, and from Cork to Dublin at 9 a.m., calling at principal stations and arriving at 12.35 p.m.; the Sunday 6.15 p.m. from Amiens Street to Cork starts 15 min. later and arrives 35 min. later, and the 6 p.m. from Cork starts 30 min. later and reaches Dublin 45 min. later, at 10.15 p.m.

A steady improvement is taking place in the service between Dublin and Limerick. The Limerick Junction stop of the 8.55 a.m. from Dublin to Tralee has a connection to Limerick, arriving at 11.30 a.m., in 2 hr. 35 min. from Dublin. A train instead of a bus connection is now provided from Limerick Junction to the 6.45 p.m. from Dublin, with a Limerick arrival at 9.40 p.m., 20 min. earlier. From Limerick there is a new service at 8.40 a.m., via Limerick Junction, reaching Dublin at 11.45 a.m.; the previous 6.20 p.m. connection from Limerick via Limerick Junction now starts at 6.30. With a Dublin arrival at 9 p.m., the latter gives a journey time of 2½ hr., the fastest ever scheduled between the two cities.

On the former Midland Great Western line there are several changes. The 9.10 a.m. express from Dublin Westland Row to Westport, hitherto publicly booked as non-stop to Athlone, has had a working stop at Castletown to cross an express in the opposite direction on the single line; this is now made a passenger stop at 10.36 a.m. The former 6 p.m. from Westland Row to Sligo starts at 6.15 p.m., but by accelerated running picks up its previous times beyond Mullingar and continues to reach Sligo at 10.10 p.m. In the reverse direction the summer 7.10 p.m. from Sligo starts 30 min. earlier, at 6.40 p.m., and is accelerated to reach Westland Row at 10.25 p.m., 43 min. earlier. This journey time of 3¾ hr. is the fastest on record between Sligo and Dublin.

The order of arrival in Athlone of the Galway and Westport portions of the "Cu na Mara" diesel express is reversed; the former starts 5 min. later, at 9.25 a.m., and the latter 10 min. earlier, at 8 a.m.; there is no change in the Dublin arrival time. The 3 hr. 2 min. from Galway to Amiens Street is also the fastest ever scheduled between Galway and Dublin. This train and its opposite number, the 6.50 p.m. from Westland Row, are the only ones of this service to travel via Portarlington, and to use the Cork main line between there and Islandbridge Junction, outside Kingsbridge. The former 3.30 p.m. from

Galway now leaves at 3.45 p.m., and has been accelerated 20 min. to reach Westland Row at 7.35 p.m.; this is the connecting service for the Holyhead steamer.

On the Wexford main line, the former 10.20 a.m. from Rosslare Harbour is now starting 60 min. earlier; the stop at Wexford North has been cut from 45 to 3 min., and the arrival at Westland Row is 1 hr. 32 min. earlier, at 1.28 p.m., and at Amiens Street 1 hr. 35 min. earlier, at 1.35 p.m.

Between Dublin and Belfast last summer's 11.40 a.m. from Belfast this summer is leaving at 12.30 p.m., and reaching Dublin Amiens Street at 3.35 instead of 2.45 p.m.; the winter 2.15 p.m. from Belfast as last summer is starting at 3 p.m. and arriving in Dublin at 6.15 p.m. The 4.45 p.m. "Enterprise" has been put on the same 2 hr. 10 min. non-stop timing over the 112·5 miles as the other "Enterprise" services, and so reaches Dublin at 6.55 p.m. There is an additional express from Dublin to Drogheda and Dundalk at 7.55 p.m., reaching Dundalk at 9.23 p.m.

New basis for management control

HIGHLY significant issues were raised by Mr. Eric A. Leslie, Vice-President, Accounting, of the Canadian Pacific Railway, at the fourth annual convention of the General Accountants' Association (Canada) in Ottawa on June 15. Addressing his audience on "the role of the accountant in electronic data processing," Mr. Leslie said that the method of obtaining general business intelligence and the actual content of that information was undergoing revolutionary change. Electronic data processing and its derivative, integrated data processing, had affected the whole basis of management control and involved a completely new way of thinking and approach. The Canadian Pacific was well advanced in the use of I.D.P.: an early pioneer in the use of punched cards, it would receive its fourth high-speed computer, an I.B.M. transistorised 7080, in October.

Railway interest centred particularly on that type of machine which permitted the simultaneous transmission of many messages over a single pair of wires or without direct physical connection. The Canadian Pacific had installed this type of equipment at 68 yards from coast to coast, with teletype transmission between adjacent yard offices and one of four regional data centres. An example of work performed was the abstraction of data from a waybill—the principal source document covering the system's freight business. Waybill information was recorded in the field office, transmitted to the data centre, and relayed to the computer centre where it was maintained on magnetic tape. At the field offices, a paper tape containing only those parts of information required for movement purposes was produced as a by-product of the original recording and filed. When trains were assembled, information covering locomotive, crew, tonnage, and so on, was punched in a tape and pieces of tape for each wagon were chosen from those previously filed. These were used to produce a continuous tape from which to print out a train consist in the order in which the train was marshalled for the conductor. The tape was then transmitted to the data centre and simultaneously to the next yard office where it was used to plan switching operations. At the data centre, it was used to give train and wagon movement information to regional offices. It was also relayed to the computer centre where it was matched up in the computer with data already received. This process was repeated each time the wagon moved and when any event affecting it occurred, such as diversions, trans-shipments, and so on. Once each day, all data were processed so that magnetic tapes were available before the opening of business. These contained a continuously up-to-date record of the physical status of all wagons up to a cut-off made a little after midnight. This record provided the foundation from which other processing produced outputs to meet all requirements of all departments.

The old method had been for each department to extract data to serve its own needs. There had been considerable duplicate manual processing of information and progressive summaries had been transmitted from one departmental level to another. Under I.D.P., main data transmission and summarising was done in an integrated flow stemming from the original mechanical recording. This change had completely altered the basis and speed of management control information.

Mr. Leslie examined the effects of I.D.P. The impact on general accounting and control had been a physical one affecting the manner in which accounting tasks were performed but not the underlying principle. Previously describable as data processors, accounting personnel in future would perform the functions of control and analysis. Analysis in turn could be greatly facilitated by I.D.P. The impact on the internal audit function had produced the problem of the creation of an audit trail when records were invisible. There must be greater emphasis on ensuring that records at point of entry into the machine processing procedures were accurate, authentic, and complete, and that the machine processing itself was sound. Internal and external auditors had two new responsibilities: to learn and apply the capacities of the new machines and to ensure that the new procedures incorporated machinery to supply audit requirements in the form of printouts and opportunities to match these with selected original documents.

Prime emphasis was given to the impact of I.D.P. on the general business intelligence function. This could now provide basic, statistical, and corporate information in a useful, easily-stored form with reliability and speed and after minimal human manipulation. The speed factor was of primary significance: up-to-date information on 100,000 freight transaction records was now available daily on officers' desks. Formerly, the system had only been able to produce gross ton-miles per train-hr. three weeks after the end of each month.

Electronic data processing made it possible to use traditional techniques in areas not heretofore practical. For example, evidence on the cost of handling grain, presented to the MacPherson Royal Commission on Transporation, was based on the most intensive analysis of railway costs ever to have been made. The computer could also be used to simulate physical operations as an aid to the solution of business problems. Mathematical models had been successfully applied in simulation of train performance, using data for different types of motive power as a basis for setting tonnage ratings and determining schedules giving the best relationship between speed and fuel consumption. The computer had also been used in the design of hump yards and centralised traffic control layouts.

One factor should receive close attention. In a large concern, only a few people could combine experience in systems analysis with knowledge of a segment of the company's procedures. At present, few systems analysts had a wide knowledge of all the new techniques. The art had moved so fast that those working in it had as many specialities as there were specialties in the medical profession. There were therefore two tasks: the first—for a small core of specialists and general practioners—to keep abreast of technical developments, and the second—for a wider group—to incorporate these new techniques in day-to-day operations. There was the danger that the initiative for planning innovations would be left to the systems analysis personnel, that is, to the first group. The work should actually be a joint effort of both groups.

Referring to the role of the accountant, Mr. Leslie said that the accounting function provided a good overall picture. Through experience of manual accounting, company accountants came to know the prime sources of the multitude of entries which make up a company's records. They were thus well qualified for a leading role in the planning and development of an integrated system of data processing. Mr. Leslie's statement may be true at the moment. But what is to happen when present accountants are succeeded by subsequent generations unused to manual processing? There appears to be a very real danger here that the small group will assume control by virtue of its specialist technical knowledge relating to the electronic machinery alone and not to the company as a whole.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

PRESERVATION OF LOCOMOTIVES

July 7

SIR, Now that the list of locomotives to be preserved by the British Transport Commission has been published, certain unfortunate omissions can be observed in the Great Western ranks. I think a representative of each of the following classes should be preserved if at all possible: 4300 2-6-0, 5101 2-6-2T., and 1400 (ex-4800) 0-4-2T.

Each of these types has good claims for preservation and I shall be pleased to hear from anyone willing to assist me in such a project. British Railways requires the following minimum prices: 2-6-0, £1,660; 2-6-2T, £1,450; and 0-4-2T, £820. These prices do not include the cost of removal. There is also the important question of housing. Nevertheless, I feel sure that if sufficient support is forthcoming, all difficulties can be overcome.

Yours faithfully,

W. A. RICHARDS

14, Dyas Avenue,
Birmingham, 22A

RAILWAYS INTO ROADS

July 13

SIR, Mr. Hamilton Ellis (July 7) refers to a " normal headway " of 120 sec. on main-line single-track railways. Perhaps he would amplify this information by giving instances of where the timetable allows 15 trains to pass along such a track during a half-hour period. He also mentions 90-sec. headway on the Great Eastern Line for an ordinary train following an express. One is prompted to wonder what is the headway after the ordinary train has been following the express for, say, 15 min., or what is the headway for the next express which follows the ordinary train ? What is the headway for an express following a goods train, as it frequently must ? The figure of 90 sec. seems to have little practical significance in connection with main-line running. It has significance (though not perhaps as much as Mr. Ellis appears to imply) in connection with the District Line of London Transport but, as has been frequently demonstrated in press correspondence the capacity of an " underground " electrified line is less than that of an unimpeded road traffic lane used by public transport, so where do these figures get us as arguments against conversion ?

The Chicago city expressway results will be interesting, when a sufficient period of operation has made them relevant. Commuting at the rate of 1 to 1½ persons a car is certainly extravagant of road space and, if alternative public transport is of such quality that people are driven to this type of car commuting, difficulties must be expected and drastic and even reactionary measures may appear desirable. It has never been advocated by the Railway Conversion League that converted routes into cities should be given over exclusively to private car commuters. We have always advocated that public passenger services on these routes should be of a high order, thus attracting many commuters who at present find conditions on the railways so unattractive that they prefer to struggle through congested streets in their cars.

Mr. Ellis concludes his letter with a very insipid " lollipop." If Brigadier Lloyd states in one place that on a particular line, under given conditions, there would be " no occasion to widen the formation," and I state elsewhere, referring to the whole system, that " the overall capacity of the converted railway system would, of course, depend on the nature of the conversion (amount of widening, etc.)," what of it ? Mr. Ellis seems to find a piquant flavour of inconsistency here which can hardly be apparent to the readers of his letter.

There is endless scope for controversy over the details of a project such as railway conversion, but the time must come when those who find this type of argument stimulating must ask themselves whether it is contributing anything to the urgent national crisis which is on us. Railway conversion *may* not be the right solution; but a solution we *must find*, and there has yet to be put forward an alternative which will stand up to scrutiny, as railway conversion has done over the past five to six years.

Yours faithfully,

M. J. DOUGLASS,
Hon. Co-ordinator

Railway Conversion League,
Hallams Heath, Shamley Green, Surrey

HIGH-PERFORMANCE LIGHTWEIGHT TRAINS

July 12

SIR, The article by " a correspondent " (who wisely chooses to remain anonymous) in your issue for June 23 is based on a comparison which is completely invalid and obviously chosen to give the impression that a diesel is " superior " to an electric train in performance.

To do this, a fictitious 830 h.p.–152 ton electric is pitted against an equally fictitious 1,920 h.p.–118 ton diesel ! While we are used now to diesel protagonists making extravagantly invalid comparisons to boost up their egos, your correspondent must be getting rather desperate to judge from his chosen figures.

A further train must be included, that of a 1,920 h.p.–118 ton electric, and this will be found to have the highest performance and shortest time of all, even when based on the continuous rating used by your correspondent. Using the short-term rating while accelerating, the electric will produce an even higher performance, leaving the diesel at the starting post, as it were.

The constant horsepower curve " Y " shown for the diesel is absolute nonsense. With a diesel mechanical railcar as shown, horsepower varies with engine-speed at the various gear ratios, giving a serrated line.

Immediately after changing gear " up," the diesel engine revolutions are reduced to a point where only about two thirds of the maximum b.h.p. are possible, and this can be a severe disadvantage on gradients where the balancing speed falls at this point. I have seen this diesel failing demonstrated most convincingly in South Wales once, where the uphill performance of a six-car diesel train was completely eclipsed by that of a steam 0–6–0T hauling six-coaches, the diesel being " stuck " on an unfavourable gear ratio, whereas the steam made use of its boiler reserve power. It is that similar short-term reserve power which emphasises the electric's natural superiority over diesel traction, and your correspondent should travel in the multiple-unit electrics used on the suburban services out of Paris (Lyon) to witness acceleration which would be virtually impossible with diesel traction.

The table of costs presented by your correspondent contains some peculiar arithmetic, the best howler being the lightweight set which runs 130 miles a day when considering crew costs, but 120,000 miles a year to amortise the additional capital. No doubt the revision of the calendar to include 923 days a year is part of your correspondent's scheme.

Yours faithfully,

A. E. DURRANT

7, Spencer Road,
Chiswick, W.4

The Scrap Heap

Our man for space

Mr. Macmillan disclosed the name of his runner in the space race to none other than Major Yuri Gagarin. Both were at a trample—officially masquerading at a reception—given by the G.B-U.S.S.R. Association at the Hyde Park Hotel. While Mr. Marples listened astounded, Mr. Macmillan told Major Gagarin: " I wouldn't be surprised if Mr. Marples went up in a spaceship—he'd do it any day of the week. Mr. Marples is one of our best climbers."—*From "In London last night."* in the " *Evening Standard*," *July* 14, 1961.

Refurbished

The two locomotives *Locomotion No.* 1 and *Derwent*, from the South end of Darlington Station have been restored to pristine newness in their original livery by the North Eastern Region of British Railways at Darlington Works. *Locomotion*, built in 1825 by Robert Stephenson & Company, hauled the first passenger train in the world on the Stockton & Darlington Railway, and is reputed to have won a race with a mail coach over four miles by 100 yd. in 1835. *Derwent* was built in 1845 by A. Kitchen at Hopetown Railway Foundry, Darlington, and was purchased by a private company for use on its own lines after running on the Stockton & Darlington Railway for many years. It was presented to the North Eastern Railway in 1898 for preservation and was exhibited at the Railway Centenary celebrations in 1925.

Going . . . going . . .

Railway stations at Christow and Ashton, both on the Teign Valley line in Devon, have been put up for sale by British Railways. The closing date for offers was July 17 and about 20 bids had been received before that date. With a modesty seldom found in vendors' descriptions of property, British Railways said that electricity at Ashton was " in close proximity." *From The Times*, *July* 13, 1961.

B.R. turns out the Old Guard

Many lined the streets at Hammersmith Broadway at midday yesterday to greet Gagarin. On the District Line below at this time there was a hitch. Eventually through Hammersmith Station came an odd train of three vehicles, an engine, an empty wagon and a brake van. The engine was beautifully polished, deep maroon, of 0-4-4 type, steam, a tank engine, and at least 60 years old. Soon after this moving episode, electric services were resumed and Mr. Gagarin passed by.—*Peterborough, in " The Daily Telegraph*," *July* 12.

Mobile canteen

The late Maharaja Sir Jiwaji Rao Scindia of Gwalia was the proud possessor of a solid gold miniature electric train. It ran on platinum rails round his oval teak dining table and carried liqueurs in golden goblets studded with rubies and sapphires, coffee, and cigars.

Off the rails

The following letter has been received by the London Midland Region of British Railways:—

Dear Sir, It gave me great satisfaction to read some weeks ago that five youths had been put off a train near Manchester because of disorderly behaviour and made to find their own way home.

If there were more of this spirit of moral courage and authority as your officers displayed, there would be less need for discussion about the use of the birch.

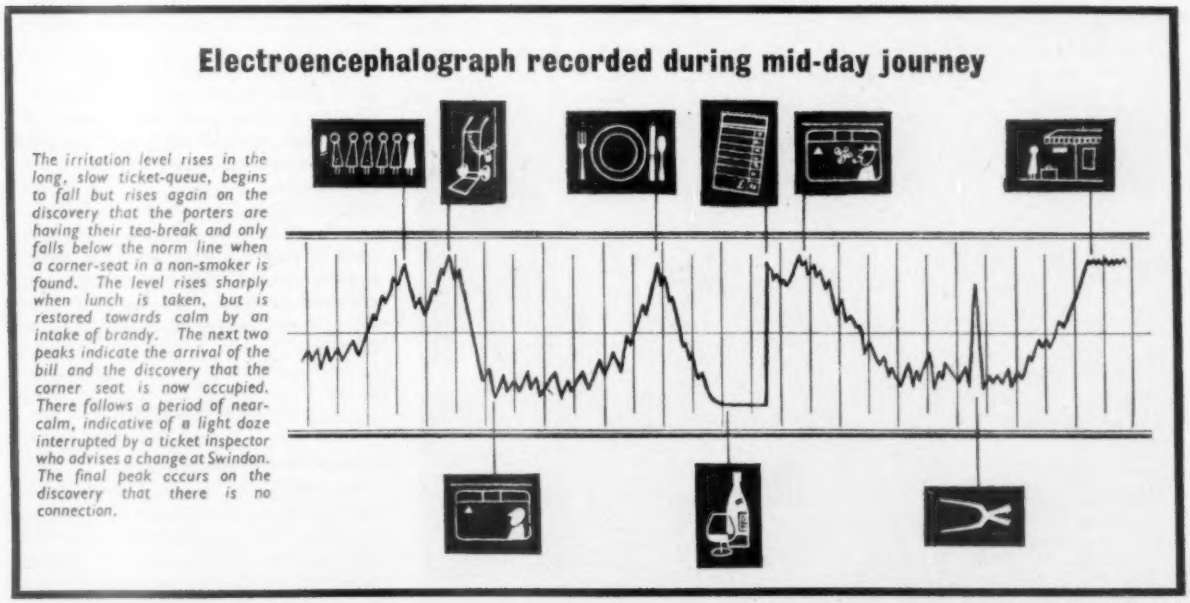
Some of our youth now know that the choice is—" Behave or walk home."

Yours truly,
(Signed) Jean D. Lodge
(Mrs.)

Black paint, of course ?

Just after Mr. Ernest Marples, Minister of Transport, told the Commons that Euston's Doric Arch would be demolished, workmen began to paint its ornamental gates.

BRAIN-WAVE ON THE RAILWAYS


Electroencephalograph recorded during mid-day journey
The irritation level rises in the long, slow ticket-queue, begins to fall but rises again on the discovery that the porters are having their tea-break and only falls below the norm line when a corner-seat in a non-smoker is found. The level rises sharply when lunch is taken, but is restored towards calm by an intake of brandy. The next two peaks indicate the arrival of the bill and the discovery that the corner seat is now occupied. There follows a period of near-calm, indicative of a light doze interrupted by a ticket inspector who advises a change at Swindon. The final peak occurs on the discovery that there is no connection.

[Reproduced by permission of " Punch "]

Artist's impression of results of "springy" rides taken in the noon-day sun

OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

FINLAND

Coaches from West Germany

Of 15 all-steel coaches recently ordered from the West German company of Maschinenfabrik Esslingen, four had arrived in Finland by May 10. They are second-class carriages seating 80 and were placed in traffic in the boat trains running between Turku and Helsinki. Subsequently, 250-300 similar coaches will be built in Finland, if necessary with changes in their construction.

SOUTH AFRICA

Cleaner travel

Steam locomotives have been taken off the Durban-Johannesburg run. Between Johannesburg and Volkrust (174 miles) trains are hauled by diesel locomotives and the line for the rest of the way (308 miles) is electrified. The Johannesburg-Cape Town line will soon be electrified from Cape Town to Beaufort West (339 miles), so that the only steam working on this route will be between Beaufort West and Klerksdorp, in the Western Transvaal.

CZECHOSLOVAKIA

Kosice-Cierna electrification completed

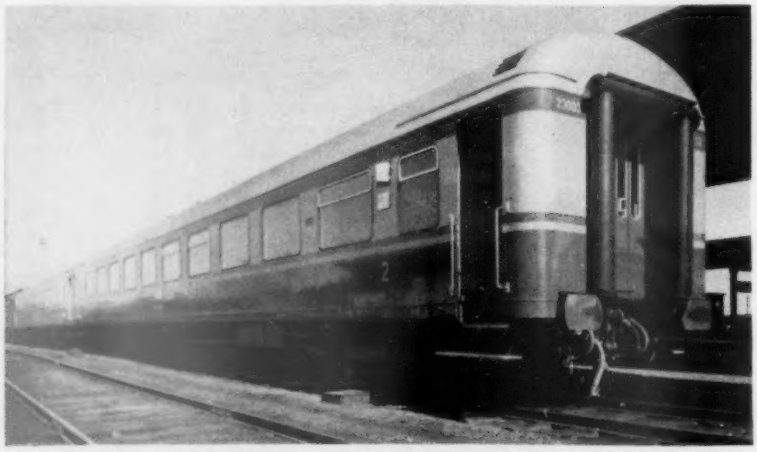
The last, Kosice, section of the electrification between Prague and Kosice, in eastern Slovakia, went in trial operation on May 31. Electrification of this line was begun in 1956. An electrified link is now established between Kosice and Cierna.

West German-built 80-seater coach for Finnish boat-trains

NIGERIA

First passenger train to Bauchi

Though the formal opening of the Kuru-Bauchi section will take place later this year, the Prime Minister of Nigeria, Sir Abubakar Tafawa Balewa, travelled to Bauchi on June 9 by the first passenger train to traverse this section of the Bornu Extension. He was accompanied by the General Manager, Mr. R. K. Innes.



West German-built second-class coaches for Finnish State Railways

COLOMBIA

Order for G.E.C. diesel-electrics

The General Electric Company of the U.S.A. has received an order worth U.S. $2,600,000 from Colombian National Railways for 15 diesel-electric locomotives with horsepower ranging from 700 to 1,420. The engines will be used on the Atlántico Railway which will connect Bogotá with the Atlantic coast.

ARGENTINA

American financial assistance

The Inter-American Development Bank announced recently that it will send two representatives to Argentina to study the completion of the Yacuiba-Santa Cruz Railway, construction of Rosario electric station, the El Chocón hydro-electric project, the Viedma Valley settlement programme, and the establishment of development credits for the interior through the provincial authorities.

NEW ZEALAND

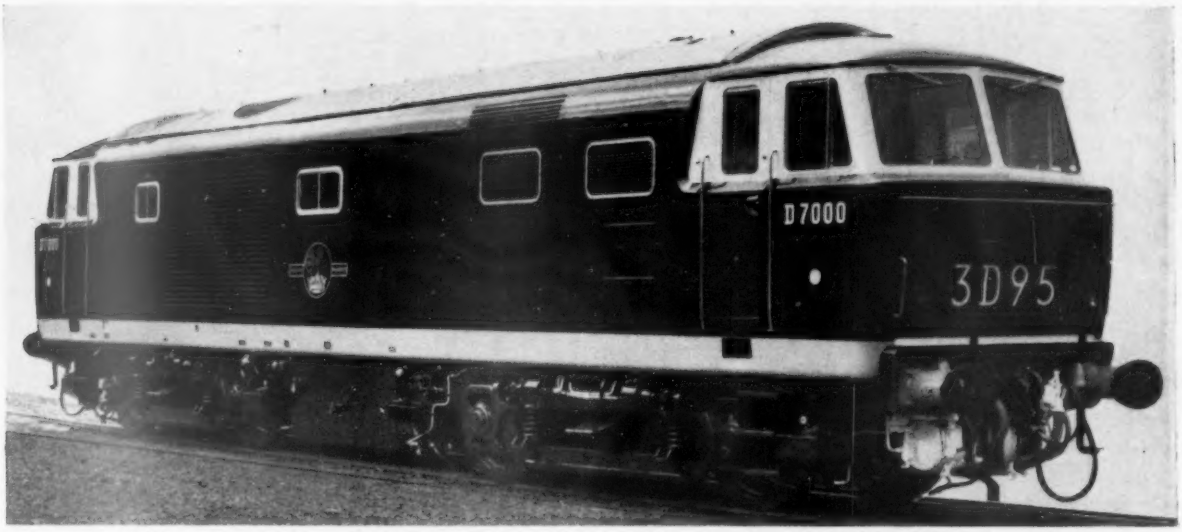
Junction with Opunake branch

On May 14 a deviation of the 22-mile branch line to Opunake, on the west coast of the North Island of New Zealand, and a new junction with the Taranaki main line were brought into use. The branch shortens the distance by half a mile, and gives direct access to that from Stratford in the north. The recent provision of marshalling yards at Stratford has enabled this traffic to be more conveniently handled at that point than at Hawera. Te Roti Junction is provided with a tablet-locked loop to hold 40 wagons and a dead-end siding to hold another 40 wagons. Admission of trains to the Opunake branch is by tablet transmitter instrument working with Eltham.

CANADA

Relocation and new hump yard

The Canadian National Railways administration has completed the relocation of its main line between Dorval and Montreal and the company's new Montreal hump yard on this section has also come into service. The yard is believed to be the largest in the world.



British Railways Type 3 Hymek locomotive

DIESEL-HYDRAULIC LOCOMOTIVES for the Western Region of British Railways

The first of 95 Type 3 locomotives of 1,700 b.h.p. intended for main-line service

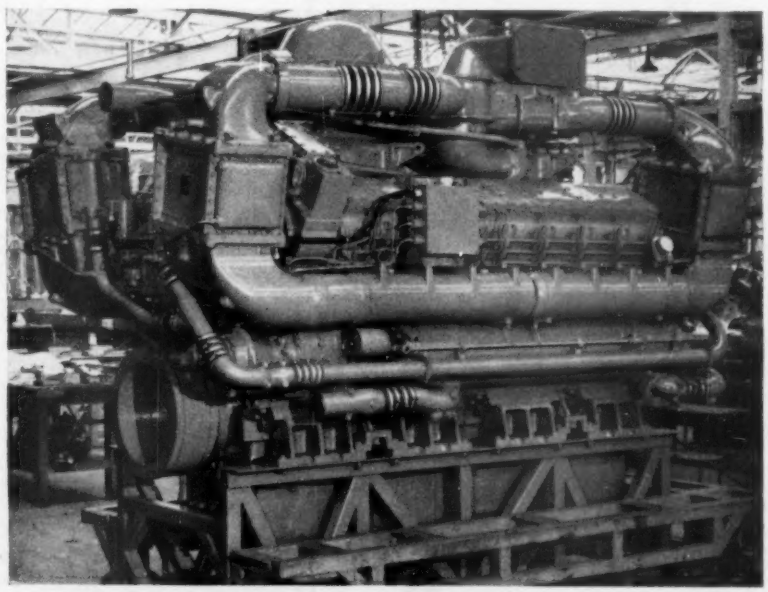
BEYER PEACOCK (Hymek) Limited, in which Bristol Siddeley Engines Limited and J. Stone & Co. (Deptford) Limited are partners with Beyer Peacock & Co. Ltd., received an order for 45 main-line diesel-hydraulic locomotives from the British Transport Commission in 1959. Delivery was due to commence at the end of July, 1961. Subsequently this order was increased, to 95 locomotives, in 1960.

Services to be worked

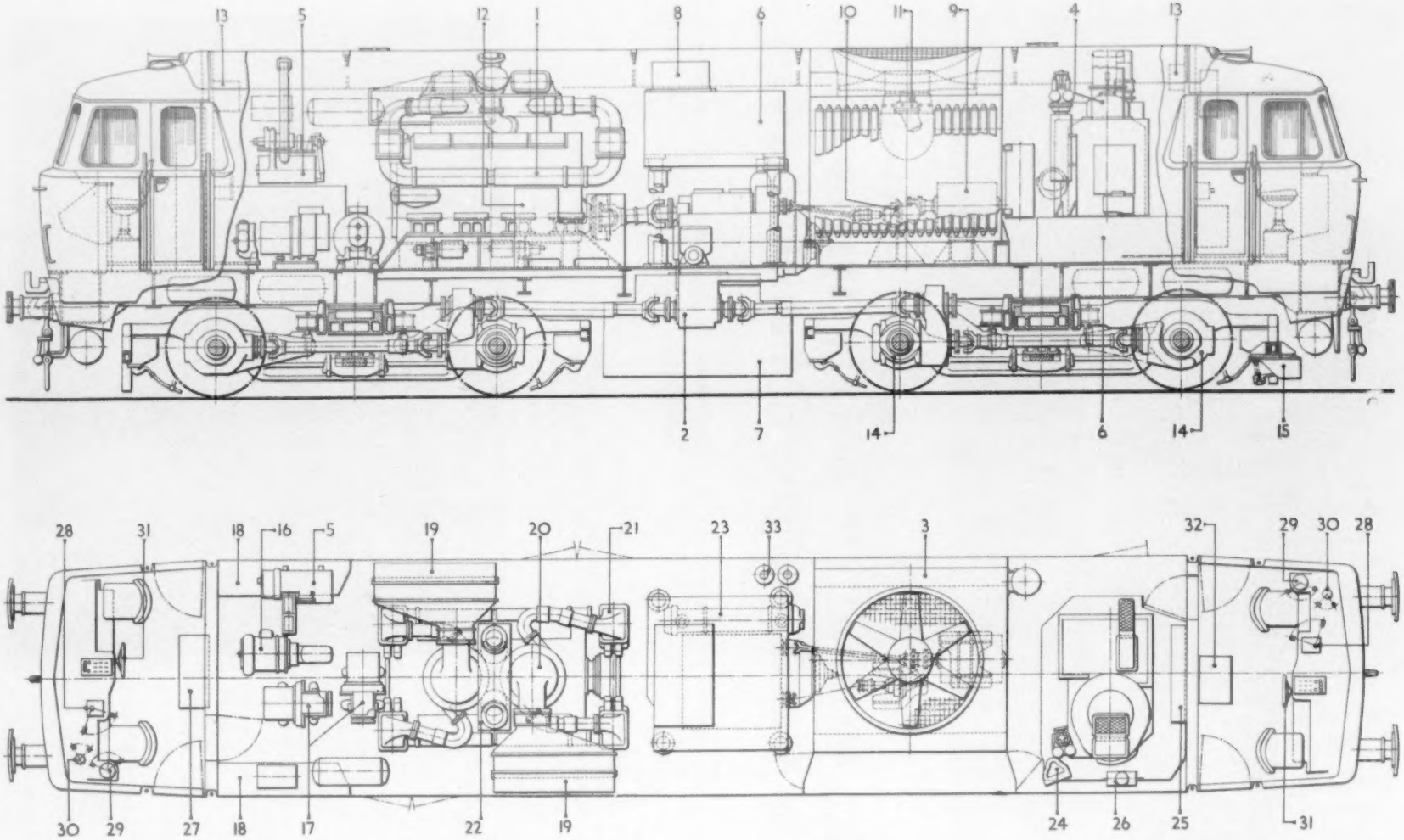
The first locomotive, as recorded in our issue of May 19 was handed over to the Western Region on May 16, a considerable improvement on the planned delivery date.

All 95 are to be used for further stages of the Western Region's schemes for the complete replacement of steam by diesel power in the Bristol area, the West of England (west of Newton Abbot), and in South Wales. They will work on the principal passenger, parcels and freight services, and many other trains between these areas and Paddington. Delivery of the Hymek locomotives is scheduled for completion in 1963.

These locomotives, of British Railways Type 3 are of a completely new design, powered by a Bristol Siddeley-Maybach MD. 870 engine, pressure-charged and intercooled. The rating for this application is 1,700 b.h.p. at 1,500 r.p.m., but N.T.P. rating of this engine is 1,920 b.h.p. at 1,500 r.p.m. As will be seen from the elevation drawing the engine is coupled by a short cardan shaft to the Stone-Maybach-Mekydro Type K184U transmission unit, in turn connected by cardan shafts to the Stone-Maybach Type C33V final-drive gearboxes on the inner axles, and the C33 units on the outer axles. The transmission cardan shafts were supplied



Bristol-Siddeley/Maybach MD.870 1,700-b.h.p. engine



1 Diesel engine
2 Transmission
3 Cooling group
4 Train-heating boiler
5 Engine preheater
6 Water tanks
7 Main fuel tanks
8 Reserve fuel tank
9 Dynastarter
10 Hydraulic pump (fan drive)
11 Hydraulic motor (fan drive)
12 Engine instrument panel
13 Automatic voltage regulator
14 Final drive gearboxes
15 A.W.S. shoe
16 Air compressor
17 Exhausters
18 Batteries
19 Air intake filters
20 Pressure-chargers
21 Intercoolers
22 Exhaust silencer
23 Transmission heat exchanger
24 Toilet
25 Toilet water tank
26 Boiler water dosage tank
27 Control cubicle
28 Controller
29 Vacuum brake valve
30 Air brake valve
31 Hand brake
32 Shore supply unit
33 Co_2 fire extinguisher bottles

Layout of Hymek 1,700 b.h.p. locomotive, showing arrangement of equipment

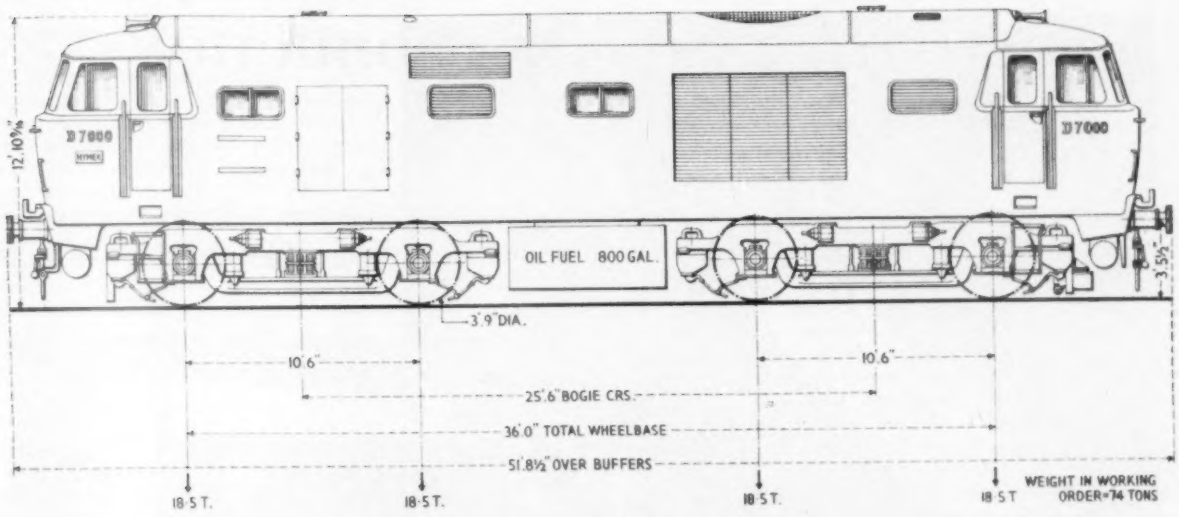


Diagram of Hymek 1,700-b.h.p. locomotive

by J. Stone & Co. (Deptford) Limited, and are of the maker's G.W.B. type.

Control equipment, manufactured by Brush Electrical Engineering Co. Ltd., was arranged for multiple-unit operation. It comprises pneumatic control for the speed of the diesel engine, with electrical control for all other equipment. The principal items of control equipment are housed in a dust-proof cabinet in the "A" cab, and the system is designed to ensure, automatically, the correct engine starting sequences and locomotive power control.

Starting is effected by a dynastarter which is coupled to the transmission, on the input side of the torque converter, by a Hardy-Spicer cardan shaft and Metalastik coupling. This machine also generates current for charging the batteries and operating auxiliaries.

Control cubicle

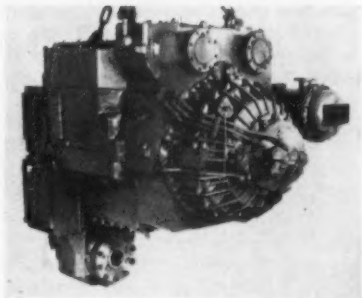
Oil-fired preheater

A Stone-Vapor-"Watchman" oil-fired preheater is provided for raising the cooling water temperature before starting. This minimises the wear which otherwise occurs when starting from cold.

Engine and transmission cooling is carried out by a Serck-Behr self-contained unit, incorporating header tanks, fitted with a fan supplied by Air Control Installations Limited and driven by a hydraulic motor. The hydraulic power for the fan drive is provided by a hydraulic pump, driven from the transmission through a Hardy-Spicer cardan shaft and a Metalastik coupling. The fan speed is thermostatically controlled, as also are the positions of the radiator shutters. The cooling system covers the engine water jacket, the inter-coolers, and the transmission heat exchanger. Train heating is by a Stone-Vapor Type OK-4616 automatic boiler. This is oil-fired and has a maximum output of 2,000 lb. per hr.

Underframe

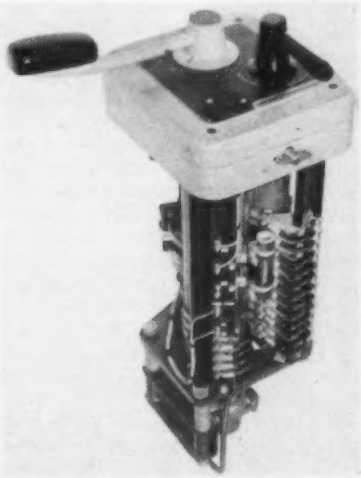
The underframe, which is of welded construction, was fabricated from rolled steel joists, plates, and sections. It is carried on cast-steel bogies, of "Commonwealth" design, the castings for which were manufactured by English Steel Corporation Limited. These bogies are of the swing-bolster type; the suspension system includes triple-elliptic spring nests between the equaliser beams and the bogie frame, with laminated springs below the bolster.



Stone-Maybach-Mekydro K.184U transmission unit

Compressed-air braking is provided on the locomotive, with vacuum brake for the train. The locomotive brakes are controlled by the vacuum brake valve, or independently by the straight

Continued on page 76



Master controller with deadman handle

POLYESTER LAMINATE PRODUCTION at Derby Works

Batch production on British Railways makes use of strong, lightweight material for many railway needs

MUCH of the interest of locomotive and rolling-stock builders in the use of resin-bonded glass-fibre components arises from the considerable weight saving possible with this material, because of the high strength/weight ratio of mouldings made in laminate form. There are other equally important advantages when compared with traditional materials; these include good electrical insulation, ease of fabrication of complicated forms, and a moulded finish equally suitable for inside or outside applications without further coating for protection against corrosion or weathering.

Considerable development in the production and use of these mouldings for railway work has been carried out by the Derby Carriage & Wagon Works of British Railways. The department concerned is housed in a shop which is well laid out for batch flow production.

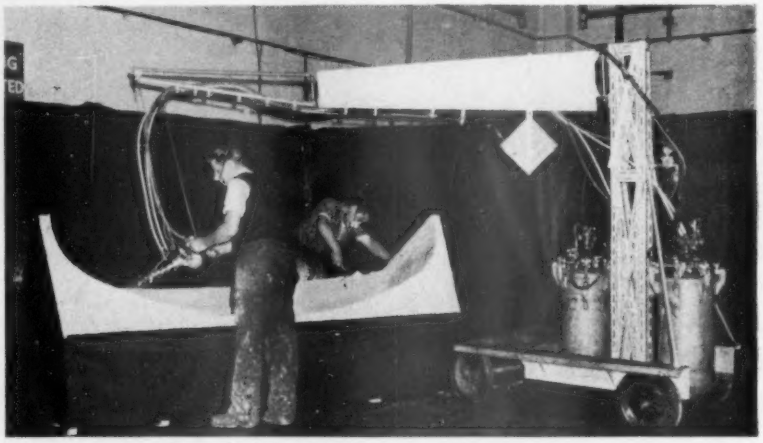
Contact moulding

Single-surface contact moulding is satisfactory for production of laminates with many applications and a particularly attractive feature of the process is the low tooling cost, which consists of either a male or female pattern or former, either in steel or timber. This feature has resulted in a wide use of polyester laminate mouldings for production work.

The introduction of machine spraying of the mould, using glass fibre rovings, and, for hand lay-up purposes, the use of chopped strand glass fibre mats, has reduced production costs considerably. It is standard practice at Derby to investigate fully the comparative production costs of traditional material and polyester laminates before producing mouldings.

Typical components which are in production in batch quantities include outside passenger carriage doors, driving cab canopies, gangway screens and combustion-heater fittings for diesel railcars; cab roof, power-compartment roof panels, partitions and ducting for diesel-electric locomotives; translucent roofs for covered goods vans; battery-box covers; and fish-box trays and indicator boards for the Civil Engineer's department. These mouldings are meeting satisfactorily all operating requirements, with a substantial overall reduction in cost.

The first large structure built in polyester laminate in quantity by British Railways was a dome-end roof canopy for a diesel railcar. This application was carried out at Derby; the canopy was selected as it is a structure of complex curvature, expensive to fabricate by hand in sheet metal, and the quantities required are not sufficient to justify the cost of press tools.



Moulding of roof canopy with Rand fibre-resin depositor

Reinforcement

Reinforcement of plastics with asbestos, paper and other fibrous matrials has been practised for many years, but before 1945 the high tensile strength of glass fibres could not be used with the resins then available, as these could be cured only by the application of high pressures, which resulted in the glass fibres being crushed. This difficulty has been overcome by the use of polyester resins in liquid form. Curing takes place by the addition to the resin of a catalyst and an accelerator, and application of pressure is unnecessary; the resulting polyester laminate is an ideal production material for many applications.

The mechanical properties of the laminates depend largely on the form in which the glass fibres are used. Typical figures for a glass-cloth laminate, and a comparison with traditional materials, are given in in the table at the foot of the page.

It will be noted that polyester glass laminates have a high tensile/weight ratio and a low modulus. On some applications this flexibility is most desirable, but where additional strength or stiffness is required this can readily be obtained by incorporating timber stiffening ribs, use of curvature, sandwich construction, or by increasing material thickness.

Strand laminate

For many applications, chopped strand mat is used for laminate production instead of the more expensive glass cloth. The physical properties of strand laminate is lower, but quite suitable for most components. Laminates of this type in production at the Derby Carriage & Wagon Works have a minimum tensile strength of 10,000 p.s.i. and a cross-breaking strength of 15,000/25,000 p.s.i.

Material	Specific Gravity	Ultimate tensile strength $\times 10^5$ lb./in.^{2}	Young's modulus $\times 10^6$ lb./in.^{2}	Specific strength $\times 10^5$	Specific modulus $\times 10^6$
Polyester/glass cloth laminate	1.7	50	2.8	29.4	1.7
Steel	7.8	125	29.0	16.0	3.7
Duralumin	2.8	65	10.0	23.2	3.6
Douglas fir	0.5	10	1.4	20.0	2.8
Hickory	0.8	20	2.3	25.4	2.9

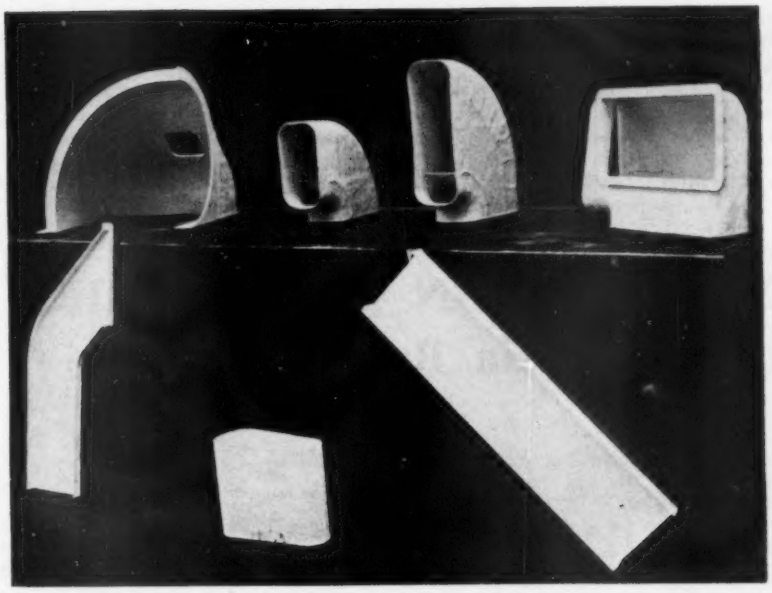
A distinctive feature of the production of components in polyester glass laminates is that the material used is compounded at the same time as the product is processed. To obtain a consistently high standard of product under these conditions a number of variable factors must be closely controlled. These factors include control of shop temperature and humidity, correct proportions and thorough mixing of resin and additives, and removal of all moisture from the glass fibre. The correct proportions of resin compound and glass fibre must be used when moulding, all air bubbles removed by rolling, and the laminate properly cured.

Quality control

To ensure that these requirements are fully met routine checks of the raw materials and the finished product are continually made by the Area Chemical Department at Derby. The tests on resins include an assessment of resistance to flame spread, accelerated weathering tests, and mechanical tests of the finished laminate. Laboratory approval is required of all materials used on production. Parts which will meet rough usage in service are subjected to an extended period of service testing before being produced in batch quantities. Outside carriage doors for diesel railcars and British Railways coaches are now in regular production and this provides a typical example of service testing. Door slam tests of these units were carried out over a very large number of cycles. No distortion, physical damage, or loosening of fittings occurred on any of these tests.

In the production of polyester laminate components several types of mould are used, according to the quantity required and size of component. The mould is made male or female according to which face is required to be smooth. A common method with large components is to produce a steel-panel mould and from this produce the production items in polyester.

Moulds for carriage doors, air ducting, and similar size parts are made in timber, polyester or sheet steel as required; in the steel moulds steam heating is incorporated in the mould. With the timber and polyester moulds, setting and curing occurs at normal shop temperature.



Mouldings for locomotive air ducting and cable trunking

A series of standard resins is now available; these are blended to provide the most suitable characteristics for various applications. These cover maximum structural rigidity at high or low temperatures, fire-retardent properties, resistance to liquid penetration, clear resin for translucent covers, and general purpose resins for components not exposed to the weather. There is also a selection of pigments for use where decorative effects or colour is required.

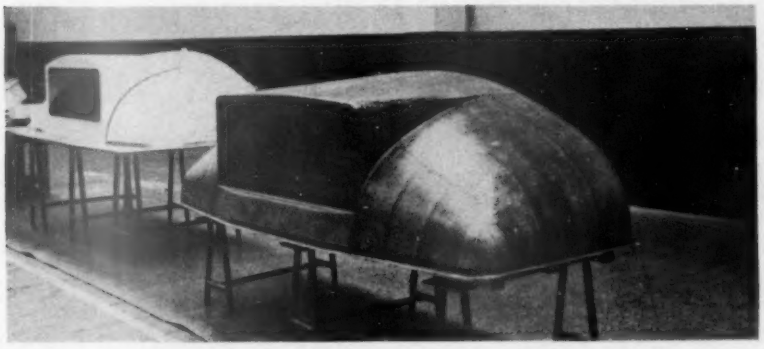
Hand lay-up moulding

The mould is prepared by washing the contact surface, followed by a light wax polishing, and a coat of release agent. Two gel coats of resin are then applied over the surface to give a gloss finish to the moulding. On flat surfaces a smooth finish is obtained by using glass fibre surfacing tissue.

The resin and catalyst paste are mixed in the proportion by weight of three parts catalyst to 100 parts resin. Immediately before use the correct amount of accelerator liquid is added to the resin, this quantity ranging from one to four per cent. The action of the catalyst is to initiate the polymerisation reaction. A liberal coat of resin is applied with a brush and on this is laid a previously cut glass mat or tailored glass cloth. The glass cloth is then rolled with a hand roller to impregnate thoroughly the cloth with the resin. The proportion of resin to glass is 3: 1 by weight. Further layers of glass cloth and resin are added to bring the laminate to the required thickness. When the construction is required in the form of a sandwich, polyurethane foam is used between the inner and outer skins. Metal attachments such as studs and fastenings are provided with a sheet-metal base and moulded in.

Machine spray moulding

The machine used for spray moulding is a Rand fibre-resin depositor. This consists of a pair of handlebars in the centre or which is a small motor-driven cutter, and on each side is an air-operated spray gun. The complete unit is suspended from the swinging arm of a wheeled trolley, the arm also carrying the feed lines to the spray heads and the air supply to the cutter motor. Stranded glass fibre in the form of rovings is fed to the cutter where it is chopped into suitable lengths and the fibres ejected on to the mould. One spray gun delivers catalysed resin and the other accelerated resin, the two streams converging with the stream of glass fibres at approximately 12 in. to 14 in. from the gun. The



Timber master mould for diesel car roof canopy

correct and uniform deposition of the glass/resin depends on the skill of the operator in directing the spray at a uniform rate across the surface of the mould. As the required layer thickness is built up, an assistant operator consolidates the laminate to remove air bubbles with a small lambs-wool roller. The air consumption of each spray gun is 12-15 c.f.m. at 75 p.s.i.; this air also is used to pressurise the two resin containers carried on the trolley. The operating controls for the spray guns and cutter motor are mounted on the handlebars. Variations in the cut-strand length are effected by changing the number of blades in the rotary cutter. Preparation of the mould before spraying and the mixing of the resin is as described for hand lay-up moulding.

Suppliers of materials used include :—

Resins ...	British Resin Products Ltd. James Beadel & Co. Ltd. Artrite Resins Limited Scott Bader & Co. Ltd. Bakelite Limited
Glass ...	Fibreglass Limited
...	Turner Bros. Asbestos Ltd.
Catalyst Paste	Novade Limited

NEW STATION AT MUFULIRA on Rhodesia Railways

Bold use of cantilevers and colour results in simple yet striking design

A STATION building has recently been completed at Mufulira, Rhodesia Railways, at a cost of £20,000. A single-storey building, its central booking hall, rises to a height double that of its side wings.

As well as the booking hall there are booking and reservations offices, first and second class ladies' rest-rooms, offices for the Stationmaster and station foremen, a third and fourth class booking office and covered queueing space, and a parcels office.

Construction of the station is of reinforced concrete portal frames with cantilevered canopies off the portal frames. The panels are filled with glazed steel curtain walling.

Booking hall

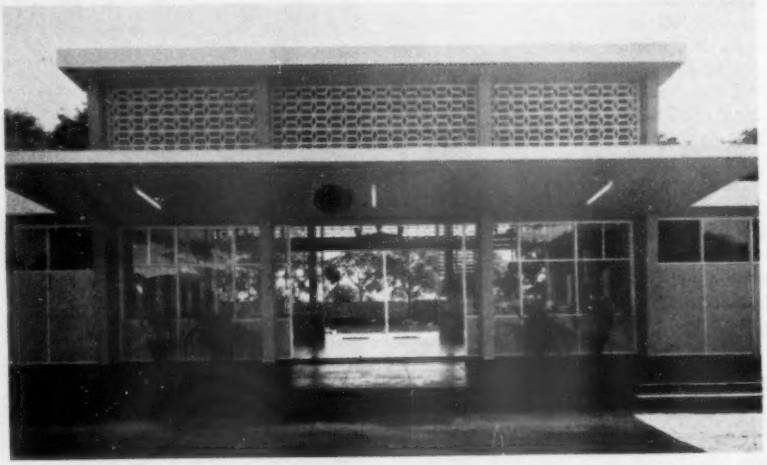
The 20-ft. high booking hall provides booking and reservation facilities and access to the Stationmaster's office and ladies' rest-room. The ends of the hall are panelled in vertical red meranti strips, and on one wall is a steel tube decorative map of the Federation of Rhodesia and Nyasaland.

The walls facing the track and entrance are glazed full height and protected from glare by a *brise-soleil* made of decorative concrete blocks. The floor is of patterned Poly-floor tiles.

Elevations are simple and rely for effect on bold cantilevers and the use of colour.

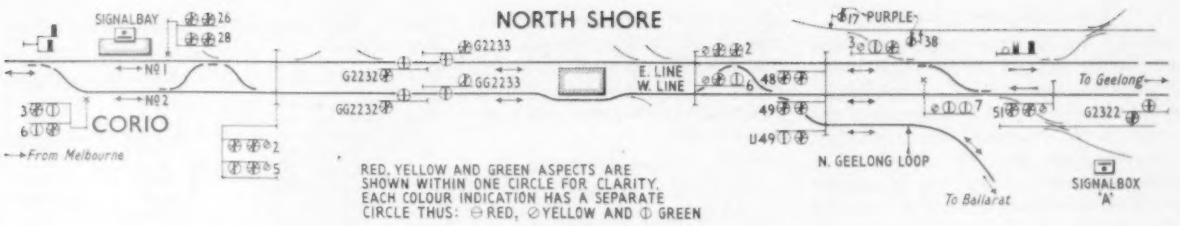
The contract commenced on April 27, 1960, and the station was completed early last March. The contractor was Delkins Limited of Kitwe. The station building was designed by the Architect of Rhodesia Railways, Mr. H. Billiard and the reinforced concrete was designed by Twisteel Limited. The electrical work was designed and executed by the Railways' Chief Electrical Engineer, Mr. G. C. Molyneux. Special lighting fittings in the booking hall were designed by the Architect and executed by Johnson & Fletcher Limited, and the General Electric Co. Ltd.

The station was opened officially in May by the Federal Member of Parliament for Mufulira, Mr. V. T. Joyce.



Exterior of new station showing brise-soleil of decorative concrete blocks

View of booking hall. Note specially-designed light fittings



TWO-WAY DOUBLE-TRACK operation in Victoria

Unique installation at Geelong makes cross-overs and elaborate signalling unnecessary

LAST year, a double track some 2½ miles in length was completed for two-way running by Victorian Railways near Geelong, 45 miles from Melbourne.

It is automatically signalled to allow trains to proceed in opposite directions as in normal double-line operation or to travel the same way so that, for instance, a fast train may overtake and pass a slow moving one. If both are Down trains the effect is that one Down train is using the Up line.

The route from Melbourne to Geelong comprises the first section of the main south-western line to Warrnambool and Port Fairy. The line is single after leaving the suburban area except for two long remote-controlled crossing loops between Newport South and Werribee and the last five miles before reaching Geelong. This five-mile stretch from Corio to Geelong is now double track and it is the 2½-mile section from Corio through North Shore to the northern end of the North Geelong marshalling yards that is automatically signalled for two-way running.

During the last few decades great industrial expansion has taken place at Geelong in what was formerly open country surrounding the city area. There are now five industrial sidings between Corio and North Geelong. These sidings were connected by electric switch-locked points to the former single track equipped with automatic signalling.

Increasing traffic

The single line had to carry increasing traffic between the sidings and the North Geelong yards as well as normal through main-line working, and certain traffic for the main western line to Ballarat is routed *via* Geelong over the North Geelong Loop connecting with the Geelong-Ballarat line. Doubling became necessary because of congestion caused by these conditions.

If the conventional form of double track with one-direction running had been provided it would have meant that, whenever the industrial sidings were being served, either the Up or the Down lines would be occupied. Crossovers and more elaborate signalling would have been required.

It was decided to double the section but to institute two-way running on both tracks. These are styled the East and West lines respectively instead of Down and Up lines as in normal practice. This installation is the first of its kind in Australia.

Main-line connection

Industrial spurs on the eastern side branch from the East line and those on the west from the West line. These branches, as formerly, are connected to the main line by electric switch-locked points. They are operated by the train staff under instructions from the train controller at Melbourne. If the East line is engaged by local shunts the West line can accommodate through traffic if the West line is engaged the through traffic can pass along the East line, and vice versa.

Corio Signalbox

Buildings on the station platform at Corio contain a signalbox with an illuminated diagram of the two-way track installation. The signalman and his counterpart in the "A" box at the northern entrance to North Geelong yards select the lines to be used and control traffic. The automatic signalling prevents trains from entering a section of the track from opposite directions and at the same time controls the distance between following trains. Long-range colour-light signals are used. Maximum permissible speed is 70 m.p.h. for passenger and 40 m.p.h. for goods trains.

The northern end of the two-way track is a little on the Melbourne side of Corio.

Continued on page 76

Automatic signal installation near North Shore

Continued from page 71

air-brake valve. One compressor and two exhausters are fitted. The brake equipment is supplied by Laycock Engineering Limited, with the exception of the motor-driven Northey flange-mounted exhausters, supplied by Gresham & Craven Limited. The full equipment provided includes compressed-air sanding gear, operated by electro-pneumatic valves controlled by pedals. "Weslak" automatic slack adjusters are incorporated in the brake rigging.

Superstructure

The superstructure, including cabs and bulkheads, but excepting the cab canopies, is manufactured from steel sheets welded to a framework of steel sections. The cab canopies are Fibreglass mouldings. The front windows of the cab are glazed with electrically heated Therglas. The cabs are electrically heated.

Sound insulation of the cabs is provided by Fibreglass insulation of the cab bulkheads and roofs.

Various protective devices are provided. These include equipment to guard against both diesel engine and locomotive overspeed. Equipment integrated in the control system offers protection against defects of lubrication, cooling water and transmission oil temperatures, and water level in the radiator header tanks. Fire protection is afforded by built-in CO_2 apparatus. Deadman and A.W.S. equipment, of the types used in the W.R., are provided.

Exterior design

The locomotives are finished in blending shades of green and the whole effect is a pleasing appearance of stability and power, to which the British Transport Commission's Design Panel and its nominated consultant paid particular attention.

These locomotives have been designed and constructed to the general requirements of the B.T.C., under the overall direction of Mr. J. F. Harrison, Chief Mechanical Engineer, British Railways Central Staff.

Mr. R. A. Smeddle, Chief Mechanical & Electrical Engineer, Western Region British Railways is responsible for collaboration and inspection with the builders.

Other leading particulars are:—

Fuel capacity	800 gal.
Boiler water capacity	800 gal.
Maximum width (over side door hinges)	8 ft. 10 in.
Starting tractive effort (30 per cent adhesion)	49,700 lb
Continuous tractive effort	33,950 lb.
Maximum service speed	90 m.p.h.
Axle load	18·5 tons
Weight in working order	74 tons

Sub-contractors include the following:—

Diesel engines	Bristol Siddeley Engines Limited
Transmission, Final drive gearboxes, Transmission cardan shafts, Train-heating boiler, Engine preheater, Speed indicator	J. Stone & Co. (Deptford) Ltd.
Control equipment, Dynastarter, Exhauster motors	Brush Electrical Engineering Co. Ltd.
Cooling equipment	Serck Radiators Limited
Cooling equipment fans	Air Control Installations Limited
Brake equipment and air compressor	Laycock Engineering Co. Ltd.
Vacuum brake exhausters	Gresham & Craven Limited
Brake slack adjusters	Westinghouse Brake & Signal Co. Ltd.
Cast steel bogies, Axles, Bearing springs	English Steel Corporation Limited
Wheels and tyres	Taylor Bros. & Co. Ltd.
Roller bearing axleboxes	British Timken Division of the Timken Roller Bearing Company
Batteries	D.P. Battery Co. Ltd.
Auxiliary cardan shafts	Hardy-Spicer Limited
Flexible couplings	Metalastik Limited
Fire extinguishing equipment	Pyrene Co. Ltd.
Fibreglass canopies	Insulation Equipment Limited
Windows	Beckett Laycock & Watkinson Limited
Air filters	Vokes Limited
Cab doors	Manganese Bronze & Brass Co. Ltd.
Cab seats	Hallam Sleigh & Cheston Limited
Level gauges	Bayham Limited
Warning horns	C.V. Desiderio
Screen wipers	Laycock Engineering Limited
Cab heaters	G. Bray & Co. Limited
Electrically-heated windows	Young & Power Limited

Two-way double-track operation in Victoria

Concluded from page 75

The platform there is single on the side of the East line. This formerly was the original single track. Stopping trains using the platform can be switched by an intermediate crossover situated a short distance south of the station if they are using the West line or coming from it.

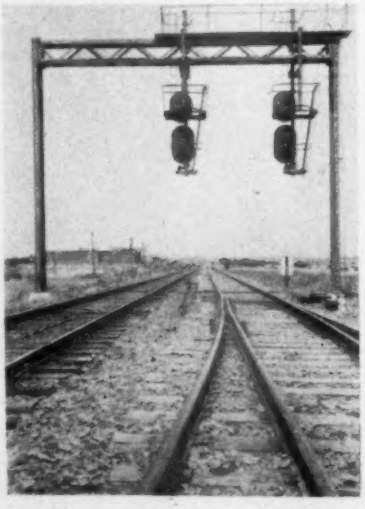
There are similar crossing facilities at the other end of the two-way track in the vicinity of the junction for the North Geelong Loop. Trains to or from the loop are generally routed over the West line between Corio and the loop junction for convenience of working.

At North Shore there is an unusual signalling installation. The tracks at this point are more than the standard width apart and, instead of a signal bridge, the signals are carried on four masts.

The station at North Shore is new and comprises an island platform and the usual buildings. It is located nearer to Geelong than the older one which it replaces.

Future improvements

It is intended eventually to double the line between Melbourne and Geelong but the project will take several years to complete and can be undertaken only as funds permit. Meanwhile, another double track for two-way running will be installed on the Melbourne end of the line. This is a six-mile stretch between Newport South and Laverton, where there is a number of industrial sidings and conditions in this respect are similar to those between Corio and North Geelong. Work has already begun on this project.



Crossover, showing points set for train to cross from west line to east line

In addition to industrial and through traffic, the line between Newport and Laverton also carries a local service to Werribee, about halfway between Melbourne and Geelong. Other improvements in this area are better passenger facilities at Paisley, a station about two miles beyond Newport. The earth-filled platform, platform fencing, and a waiting room will be repaired. A station nameboard and improved platform lighting will be provided.

In 1949 the Parliamentary Public Works Committee had recommended that the Geelong line be electrified. This plan has been abandoned because it is no longer an economic proposition.

It is considered that the heavy initial cost of electrification would not be justified in view of the success of diesel-electric locomotive operation. Moreover, diesel fuel is cheaper than the cost of generating electric power.

RAIL AND DRIVE-YOURSELF CAR FACILITIES

Passengers travelling by train to Melbourne, Mildura, or inter-state capitals in Australia can arrange for a "drive yourself" car to be available at their destinations. They have only to make their request at their local railway station when purchasing tickets, or to the conductor of the train. A fixed scale of charges is made for the cars, but the railways make no charge to passengers for arranging the facility.

PERSONAL

British Railways

MR. A. R. CRIGHTON, Assistant to the Running & Maintenance Officer (Utilisation), H.Q. Organisation, Glasgow, British Railways, Scottish Region, who, as recorded in our June 23 issue, has been appointed District Running & Maintenance Engineer, Perth, entered the railway service as an apprentice at Cowlairs, London Midland & Scottish Railways, in 1922. He has been a Supervisory Foreman and Shed Foreman in England and

Mr. A. R. Crighton

Scotland, and before transferring to Glasgow in 1957, he was employed at Derby, British Railways, London Midland Region.

MR. P. G. PRICE, District Goods Manager, Manchester, British Railways, London Midland Region, has retired.

MR. R. A. SUNMAN, Stationmaster, Heads Nook, British Railways, North Eastern Region, has been appointed Stationmaster, Alston.

MR. J. W. A. JARDINE, Stationmaster, Cargo Fleet, British Railways, North Eastern Region, has been appointed Stationmaster, Brampton Junction.

MR. G. C. FELL, Assistant to District Goods Manager, Broad Street, London, British Railways, London Midland Region, has been appointed Assistant District Goods Manager, Warrington.

MR. D. C. J. GROVER, F.R.I.C.S., Assistant (General) to the Estate & Rating Surveyor, Euston, British Railways, London Midland Region, who, as recorded in our July 21 issue, has been appointed Assistant Estate & Rating Surveyor, joined the former Southern Railway in 1926 and for nearly four years was attached to a special branch of the

Mr. D. C. J. Grover

General Manager's Office. In 1946 he was appointed London District Estate Surveyor and in 1953 to a similar position on the London Midland Region. Mr. Grover was appointed Assistant (General) to the Estate & Rating Surveyor in 1955.

MR. T. NEAL, Treasurer, Euston, British Railways, London Midland Region, has retired.

MR. F. FANCUTT, Assistant Director of Research (Chemical Services), British Railway Research Department, British Transport Commission, has retired.

MR. H. C. TALBOT, British Railways General Agent for France, has been elected President of the British Chamber of Commerce in France.

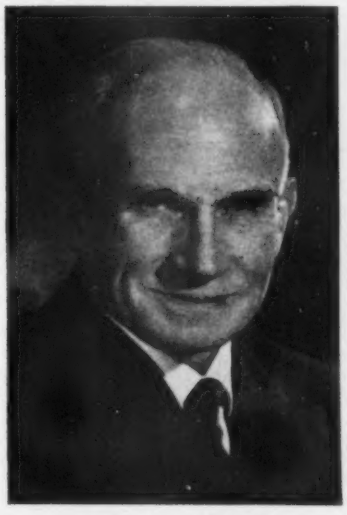
British Transport Docks

MR. S. T. EVANS, Assistant Dock Manager, Swansea, British Transport Docks, has been appointed Dock Manager, Port Talbot.

MR. H. BURNICLE, Assistant Docks Manager, Garston, British Transport Docks, has been appointed Assistant Port Master, Grimsby & Immingham Docks, to succeed MR. J. MOIR who is to retire on July 31.

London Transport Executive

MR. A. T. WILFORD, B.SC., A.R.C.S., F.R.I.C., C.I.MECH.E., F.INST.PET., Director of Research London Transport Executive, who retired on June 30, was educated at Wilson's Grammar School, Camberwell, and obtained his degree at the Imperial College of Science and Technology. During the 1914-18 war he served in the Special Brigade, Royal Engineers, and later with the Royal Field Artillery. He entered the service of the former underground companies in 1920 as Chemist with the London General Omnibus Company and became Chief Chemist in 1926, a post which he continued to occupy under the London Passenger Transport Board. He became Superintendent of Laboratories when the Laboratory Services of the London Transport Executive were centralised in January, 1949, and in



Mr. A. T. Wilford

May, 1950, he was appointed to the new post of Director of Research. He served on a number of committees and for several years was a member of Council of the Institute of Petroleum. He is the author of a number of papers concerning the use of fuels and lubricants in road service vehicles and for one of these he was awarded the Crompton-Lanchester Medal of the Institution of Mechanical Engineers. He has also contributed papers dealing with Operational Research in London Transport.

Overseas

MR. W. G. WRIGHT, General Mail & Baggage Agent, Montreal, Canadian Pacific Railway, has been appointed Manager, Mail & Baggage Traffic.

MR. R. SOMMERVILLE, General Manager, Canadian National Hotels Limited, who has retired was born in Scotland and studied hotel management in England, France and Egypt, before becoming Hotel Manager at an English summer resort. From England Mr. Sommerville went to Los Angeles, California, and then became Manager of the Selby Hotel, Toronto. He joined the C.N.R. Hotels Department in 1929 and in 1935 was

Mr. R. Sommerville

appointed Assistant Manager, Chateau Laurier, Ottawa. In 1937 he became Manager Jasper Park Lodge and subsequently held similar positions at the Bessborough Hotel, Saskatoon, and the Nova Scotian Hotel, Halifax. Mr. Sommerville became General Manager, Canadian National Hotels Limited, in 1942.

MR. M. V. STEPHENSON, Projects Officer, New Zealand Government Railways, has been appointed Assistant Transportation Superintendent.

MR. J. W. G. MACDOUGALL, Q. C., Commission Counsel, Canadian National Railways, who, as recorded in our June 30 issue, has been appointed General Solicitor, was called to the Bar of Nova Scotia in 1941 after graduating from Dalhousie University, Halifax. He joined the Canadian National Railways in 1946 as Assistant Solicitor, Montreal, and later became Solicitor, Regional Counsel, at Moncton, and then Commission Counsel at Headquarters, Montreal.

Mr. J. W. G. MacDougall

Industrial

MR. D. H. LINDLEY has been appointed Contracts Manager, Small & Parkes Limited.

SIR HAMISH MACLAREN has been appointed Consultant to Associated Electric Industries Limited.

MR. J. F. D. WOOD, General Sales Manager, Sanders & Foster Limited, has been appointed to the board as Sales Director.

MR. W. G. ALLEN has been re-elected Chairman of the British Transport Vehicle Manufacturers' Association for 1961-62.

MR. W. BAMFORD and MR. B. E. NEWMAN have been elected to the board of the Infra Red Development Co. Ltd. MR. J. B. JOHNSTON has been appointed Secretary.

MR. G. M. WILSON, Under-secretary, Overseas Finance Division, H.M. Treasury, has been appointed Consultant on the staff of the World Bank.

MR. J. T. MCCARLEY, Director of Manufacturing International, Yale & Towne Manufacturing Company, has been appointed Managing Director of the British Division.

MR. A. KIERNAN and MR. S. SMILEY, Edward G. Herbert Limited, have retired. MR. C. E. ROGERSON and MR. V. M. MARSHALL were appointed Directors. Mr. Rogerson was also elected Vice-Chairman.

MR. R. V. MUSPRATT, Used Equipment Merchandising Manager, Massey-Ferguson (United Kingdom) Limited, has been appointed Northern Regional Manager. MR. I. D. BIRDSEYE, Area Manager, has been appointed East Central Regional Manager. MR. J. H. ROBERTS, Northern Regional Manager, has been appointed Industrial Sales Manager.

A category of head office executives has been established by Vickers Limited, styled Principal Officers of Vickers Limited. The following appointments have been announced: MR. J. H. ROBBIE, to be Comptroller; DR. C. F. BAREFORD to be Controller of Research (retaining his appointment as Managing Director, Vickers Research Limited); MR. N. H. JACKSON to be Controller of Contracts; MR. J. G. LLOYD to be Controller of Forward Development. In addition to their existing duties LT. COMMANDER R. B. LARKIN is to be Assistant Managing Director (Northern Works), and MR. S. P. WOODLEY is to be Director & Assistant Managing Director (Southern Works), Vickers-Armstrong (Engineers) Limited. MR. J. A. KILLICK has been appointed Director & General Manager, Crayford, Dartford, and Thames Works, Vickers-Armstrong (Engineers) Limited. MR. H. F. JUDD has been appointed Managing Director, Loco Limited.

Institute of Transport

The following have been elected to serve on the Council of the Institute of Transport from October 1, 1961: MR. W. M. DRAVERS, Executive, British Electric Traction Co. Ltd.; MR. H. J. HANNA, General Manager, Port of Preston Authority; MR. B. H. HARBOUR, Member, London Transport Executive; MR. G. H. C. LEE, Commercial Director, British Overseas Airways Corporation; MR. J. A. MACCONOCHIE, Managing Director, Shaw, Savill & Albion Co. Ltd.; MR. F. G. MAXWELL, Operating Manager (Railways), London Transport Executive; MR. J. G. TIMPSON, General Manager & Engineer, Plymouth City Transport; MR. P. A. WHITE, Assistant General Manager (Traffic), British Railways, Southern Region; MR. J. P. YOUNG, Divisional Manager (Scotland), British Road Services; MR. C. O. POTTER (Associate Member), Director, Pease Transport Limited and Silver Roadways Limited.

Transport Users' Consultative Committee

MR. J. M. HEYGATE has been appointed a member of the Transport Users' Consultative Committee for the East Midland Area until May 31, 1962, as a representative for agriculture in place of COL. R. VAUGHAN-WILLIAMS who has resigned because of ill health.

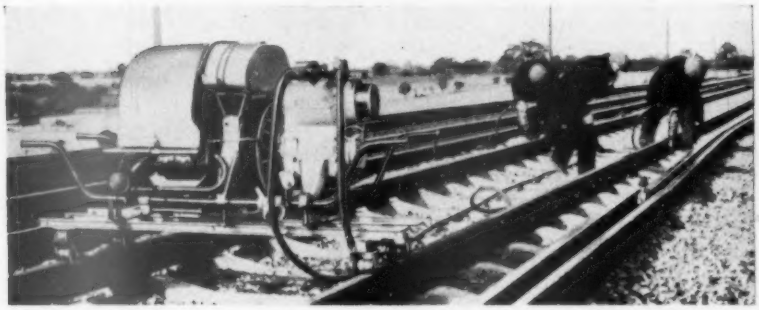
Obituary

We regret to record the death, on July 8, of MR. G. SANDLAND of the International Nickel Co. (Mond) Ltd.

We regret to record the death, on July 9 at the age of 78, of MR. E. L. CADWALLADER, Consulting Director, C.A.V. Limited.

We regret to record the recent death of MR. P. B. ANGUS, who was, until his retirement in 1950, Chief Mechanical Engineer, New Zealand Government Railways. Mr. Angus joined the railway service at Invercargill in 1910 as a mechanical engineering cadet, and in 1915, became a draughtsman in the Office of the Chief Mechanical Engineer. During the 1914-18 war he served overseas with the 1st New Zealand Expeditionary Force as a Lieutenant in the Engineers. On his return to civil life in 1919 he was appointed Assistant Locomotive Engineer at Auckland, he then became, successively, Locomotive Engineer at Greymouth, Auckland, Wellington and Christchurch. In 1925 Mr. Angus visited America, Africa, Europe and Australia to study mechanical engineering problems, and the following year was appointed Assistant Chief Mechanical Engineer at Wellington. He attended the Australian and New Zealand Railways Officers' Conference at Adelaide in 1929, and in 1930 made personal observations of diesel traction on American and European railways. The office of Chief Mechanical Engineer was abolished in 1933 and Mr. Angus became Locomotive Superintendent; he held this position until his appointment as Chief Mechanical Engineer in 1941. He came to Great Britain in 1946 to arrange contracts for the supply of freight wagons and multiple-unit electric coaches for the Hutt Valley electrification project, and in 1949 was a Member of the technical mission which investigated railway electrification in Great Britain, America and the European Continent. He was an Associate Member of the Institution of Mechanical Engineers, a Member of the Institution of Locomotive Engineers, and of the Institute of New Zealand Engineers.

NEW EQUIPMENT *and Processes*



TRACK BONDING MACHINE

Illustrated below and to the right is a three-spindle track bonding machine designed to ease the problems confronting signal engineers where triple bonding is required. It offers special advantages in that it fits under and is left beneath the rail, where it is clear of passing traffic. It drills three 9/32-in. holes through the web of flat-bottom or bull-head rail at 3 in. centres. The drill is powered by a portable generator and requires 1 kV. at 110V.

Further details can be obtained from the manufacturer, the Eureka Engineering Company, Prospect Place, Masons Hill, Bromley, Kent.

RAIL-BORNE COMPRESSORS

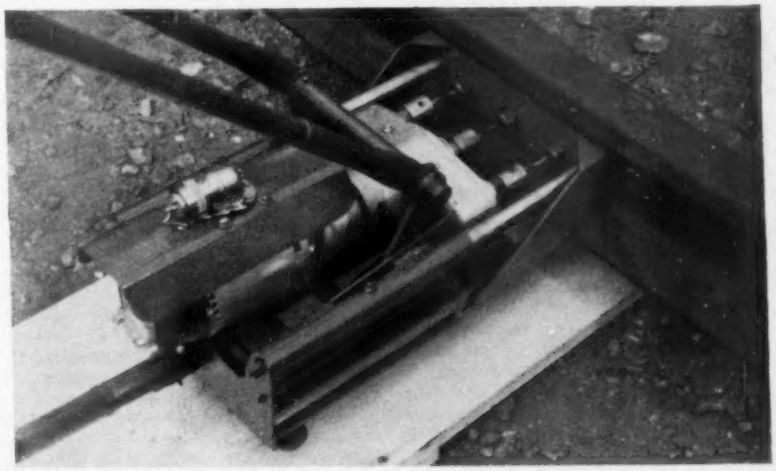
To carry the Hymatic-Hydrovane compressor supplying air for working the impact wrenches used while removing and replacing rail fastenings, the North Eastern Region of British Railways has developed the lightweight rail trolley illustrated above.

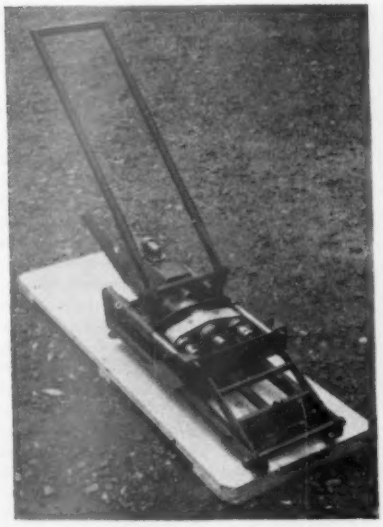
When laying long-welded rails service rails are used to position concrete sleepers in prefabricated-track lengths. Later two compressors on trollies supply power to remove the rail fastenings except those on every fifth sleeper, which retain the service rails until the rail-carrying train passes over them. The 600-ft. rails are then off-loaded in pairs. A second pair of compressors follows, operating four more impact wrenches which refix the fastenings of the new rails.

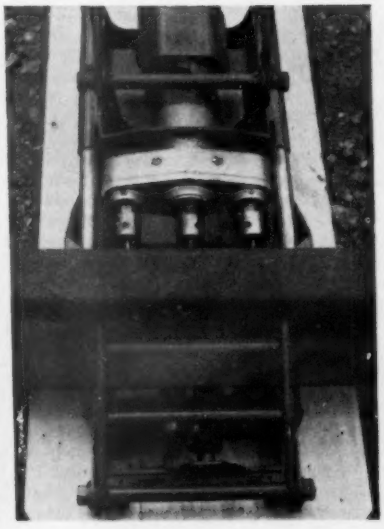
IN-SITU POLE TREATMENT

Prinsote is an *in-situ* surface application incorporating creosote oil for telegraph transmission poles. Early inspection of treated poles now under trial by an Electricity Board indicates successful penetration of the outer layers of sapwood with high concentrations of creosote and re-charging of the depleted creosote areas.

Further details can be obtained from Burt, Boulton & Haywood Limited, Brettenham House, Lancaster Place, London, W.C.2.







BUTYL MASTIC

Sealbead butyl mastic is a double-glazing and curtain-wall mastic.

The butyl rubber content has the same molecular structure as the raw material and is sufficient to lubricate the filler portion. The mastic is said to remain permanently pliable.

Sealbead is claimed to have good resistance to acid and alkalis and to be heat-resistant.

Further details may be obtained from Hodgson, Scott & Co. Ltd., Wilbert Lane, Beverley, Yorkshire.

Mr. R. Sommerville

appointed Assistant Manager, Chateau Laurier, Ottawa. In 1937 he became Manager Jasper Park Lodge and subsequently held similar positions at the Bessborough Hotel, Saskatoon, and the Nova Scotian Hotel, Halifax. Mr. Sommerville became General Manager, Canadian National Hotels Limited, in 1942.

MR. M. V. STEPHENSON, Projects Officer, New Zealand Government Railways, has been appointed Assistant Transportation Superintendent.

MR. J. W. G. MACDOUGALL, Q. C., Commission Counsel, Canadian National Railways, who, as recorded in our June 30 issue, has been appointed General Solicitor, was called to the Bar of Nova Scotia in 1941 after graduating from Dalhousie University, Halifax. He joined the Canadian National Railways in 1946 as Assistant Solicitor, Montreal, and later became Solicitor, Regional Counsel, at Moncton, and then Commission Counsel at Headquarters, Montreal.

Mr. J. W. G. MacDougall

Industrial

MR. D. H. LINDLEY has been appointed Contracts Manager, Small & Parkes Limited.

SIR HAMISH MACLAREN has been appointed Consultant to Associated Electric Industries Limited.

MR. J. F. D. WOOD, General Sales Manager, Sanders & Foster Limited, has been appointed to the board as Sales Director.

MR. W. G. ALLEN has been re-elected Chairman of the British Transport Vehicle Manufacturers' Association for 1961-62.

MR. W. BAMFORD and MR. B. E. NEWMAN have been elected to the board of the Infra Red Development Co. Ltd. MR. J. B. JOHNSTON has been appointed Secretary.

MR. G. M. WILSON, Under-secretary, Overseas Finance Division, H.M. Treasury, has been appointed Consultant on the staff of the World Bank.

MR. J. T. MCCARLEY, Director of Manufacturing International, Yale & Towne Manufacturing Company, has been appointed Managing Director of the British Division.

MR. A. KIERNAN and MR. S. SMILEY, Edward G. Herbert Limited, have retired. MR. C. E. ROGERSON and MR. V. M. MARSHALL were appointed Directors. Mr. Rogerson was also elected Vice-Chairman.

MR. R. V. MUSPRATT, Used Equipment Merchandising Manager, Massey-Ferguson (United Kingdom) Limited, has been appointed Northern Regional Manager. MR. I. D. BIRDSEYE, Area Manager, has been appointed East Central Regional Manager. MR. J. H. ROBERTS, Northern Regional Manager, has been appointed Industrial Sales Manager.

A category of head office executives has been established by Vickers Limited, styled Principal Officers of Vickers Limited. The following appointments have been announced: MR. J. H. ROBBIE, to be Comptroller; DR. C. F. BAREFORD to be Controller of Research (retaining his appointment as Managing Director, Vickers Research Limited); MR. N. H. JACKSON to be Controller of Contracts; MR. J. G. LLOYD to be Controller of Forward Development. In addition to their existing duties LT. COMMANDER R. B. LARKIN is to be Assistant Managing Director (Northern Works), and MR. S. P. WOODLEY is to be Director & Assistant Managing Director (Southern Works), Vickers-Armstrong (Engineers) Limited. MR. J. A. KILLICK has been appointed Director & General Manager, Crayford, Dartford, and Thames Works, Vickers-Armstrong (Engineers) Limited. MR. H. F. JUDD has been appointed Managing Director, Loco Limited.

Institute of Transport

The following have been elected to serve on the Council of the Institute of Transport from October 1, 1961: MR. W. M. DRAVERS, Executive, British Electric Traction Co. Ltd.; MR. H. J. HANNA, General Manager, Port of Preston Authority; MR. B. H. HARBOUR, Member, London Transport Executive; MR. G. H. C. LEE, Commercial Director, British Overseas Airways Corporation; MR. J. A. MACCONOCHIE, Managing Director, Shaw, Savill & Albion Co. Ltd.; MR. F. G. MAXWELL, Operating Manager (Railways), London Transport Executive; MR. J. G. TIMPSON, General Manager & Engineer, Plymouth City Transport; MR. P. A. WHITE, Assistant General Manager (Traffic), British Railways, Southern Region; MR. J. P. YOUNG, Divisional Manager (Scotland), British Road Services; MR. C. O. POTTER (Associate Member), Director, Pease Transport Limited and Silver Roadways Limited.

Transport Users' Consultative Committee

MR. J. M. HEYGATE has been appointed a member of the Transport Users' Consultative Committee for the East Midland Area until May 31, 1962, as a representative for agriculture in place of COL. R. VAUGHAN-WILLIAMS who has resigned because of ill health.

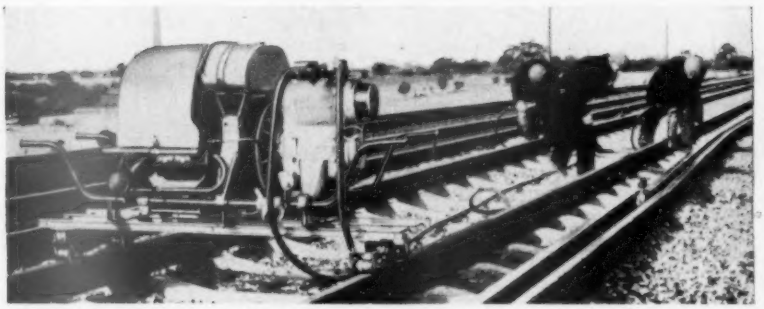
Obituary

We regret to record the death, on July 8, of MR. G. SANDLAND of the International Nickel Co. (Mond) Ltd.

We regret to record the death, on July 9 at the age of 78, of MR. E. L. CADWALLADER, Consulting Director, C.A.V. Limited.

We regret to record the recent death of MR. P. R. ANGUS, who was, until his retirement in 1950, Chief Mechanical Engineer, New Zealand Government Railways. Mr. Angus joined the railway service at Invercargill in 1910 as a mechanical engineering cadet, and in 1915, became a draughtsman in the Office of the Chief Mechanical Engineer. During the 1914-18 war he served overseas with the 1st New Zealand Expeditionary Force as a Lieutenant in the Engineers. On his return to civil life in 1919 he was appointed Assistant Locomotive Engineer at Auckland, he then became, successively, Locomotive Engineer at Greymouth, Auckland, Wellington and Christchurch. In 1925 Mr. Angus visited America, Africa, Europe and Australia to study mechanical engineering problems, and the following year was appointed Assistant Chief Mechanical Engineer at Wellington. He attended the Australian and New Zealand Railways Officers' Conference at Adelaide in 1929, and in 1930 made personal observations of diesel traction on American and European railways. The office of Chief Mechanical Engineer was abolished in 1933 and Mr. Angus became Locomotive Superintendent; he held this position until his appointment as Chief Mechanical Engineer in 1941. He came to Great Britain in 1946 to arrange contracts for the supply of freight wagons and multiple-unit electric coaches for the Hutt Valley electrification project, and in 1949 was a Member of the technical mission which investigated railway electrification in Great Britain, America and the European Continent. He was an Associate Member of the Institution of Mechanical Engineers, a Member of the Institution of Locomotive Engineers, and of the Institute of New Zealand Engineers.

NEW EQUIPMENT *and Processes*



TRACK BONDING MACHINE

Illustrated below and to the right is a three-spindle track bonding machine designed to ease the problems confronting signal engineers where triple bonding is required. It offers special advantages in that it fits under and is left beneath the rail, where it is clear of passing traffic. It drills three 9/32-in. holes through the web of flat-bottom or bull-head rail at 3 in. centres. The drill is powered by a portable generator and requires 1 kV. at 110V.

Further details can be obtained from the manufacturer, the Eureka Engineering Company, Prospect Place, Masons Hill, Bromley, Kent.

RAIL-BORNE COMPRESSORS

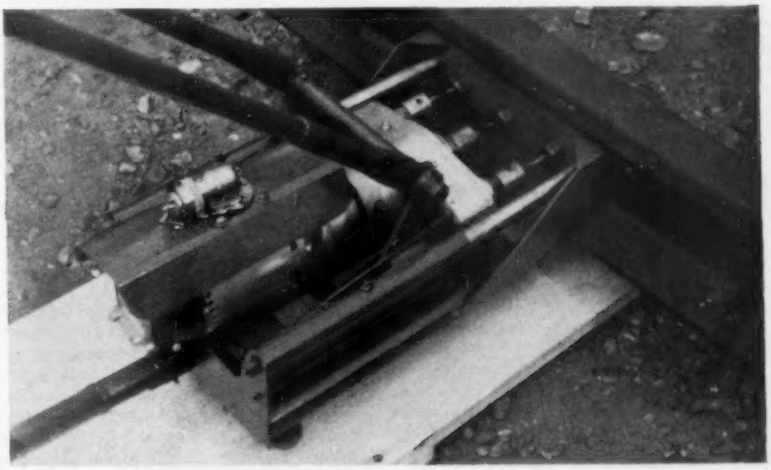
To carry the Hymatic-Hydrovane compressor supplying air for working the impact wrenches used while removing and replacing rail fastenings, the North Eastern Region of British Railways has developed the lightweight rail trolley illustrated above.

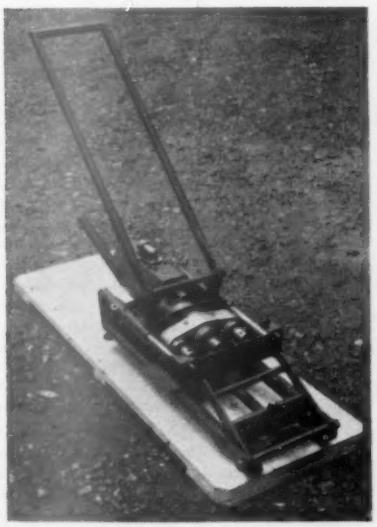
When laying long-welded rails service rails are used to position concrete sleepers in prefabricated-track lengths. Later two compressors on trollies supply power to remove the rail fastenings except those on every fifth sleeper, which retain the service rails until the rail-carrying train passes over them. The 600-ft. rails are then off-loaded in pairs. A second pair of compressors follows, operating four more impact wrenches which refix the fastenings of the new rails.

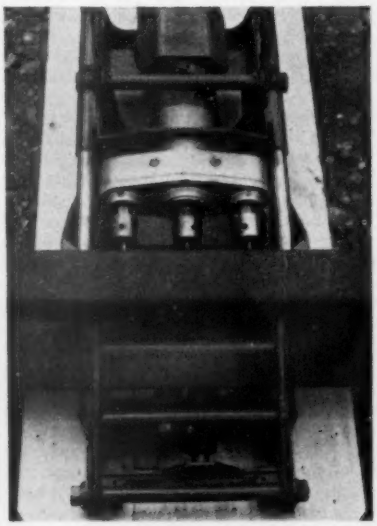
IN-SITU POLE TREATMENT

Prinsote is an *in-situ* surface application incorporating creosote oil for telegraph transmission poles. Early inspection of treated poles now under trial by an Electricity Board indicates successful penetration of the outer layers of sapwood with high concentrations of creosote and re-charging of the depleted creosote areas.

Further details can be obtained from Burt, Boulton & Haywood Limited, Brettenham House, Lancaster Place, London, W.C.2.







BUTYL MASTIC

Sealbead butyl mastic is a double-glazing and curtain-wall mastic.

The butyl rubber content has the same molecular structure as the raw material and is sufficient to lubricate the filler portion. The mastic is said to remain permanently pliable.

Sealbead is claimed to have good resistance to acid and alkalis and to be heat-resistant.

Further details may be obtained from Hodgson, Scott & Co. Ltd., Wilbert Lane, Beverley, Yorkshire.

Ministry of Transport Accident Report

Collision at Castlecary on the Glasgow-Edinburgh line, British Railways, Scottish Region, on September 2, 1960

Colonel J. R. H. Robertson, Inspecting Officer of Railways, Ministry of Transport, inquired into the collision, at about 7.58 a.m. on September 2, 1960, between the 7.30 a.m. six-coach diesel multiple-unit passenger train from Glasgow and a four-coach empty coaching-stock (E.C.S.) train between the Up home No. 2 and the Up starting signals at Castlecary on the Glasgow-Edinburgh line.

The Castlecary distant signal had been at clear when the diesel train passed it, but when the train was travelling at speed, the driver saw at short range the Up home No. 1 signal at danger. His reaction was slow and he braked too late to stop short of the train ahead. The E.C.S. train had been stopped at No. 1 home signal, but after both homes and also the starting signal had been cleared, he was approaching the starter when this was put back to danger. Fortunately he had no time to apply his brakes before the collision occurred. The relative speed at the time of the collision was between 10 and 15 m.p.h.

Only 9 out of 123 passengers on the diesel train were so injured as to need hospital treatment. Immediate aid was given by two doctors who were travelling on the train, and also by a local doctor, but owing to an error of judgment by the Castlecary Station-master ambulances were not summoned until 9.15 a.m. Other emergency arrangements were prompt. Although the morning mist had begun to thicken in patches into fog, weather conditions until very shortly before the collision had not warranted the calling out of fog signalmen. It was not raining.

Very important route

The main line route involved is classified as "very important." Reading in the Up direction, Dullatur East signal box is two miles in the rear of Castlecary signalbox, and Greenhill Junction signalbox 1¼ miles in advance. At Castlecary, the Up distant signal is 1,389 yd. in the rear of the No. 1 home signal, which in turn is 235 yd. in the rear of No. 2 home signal. The signalbox is 77 yd. and the starting signal 469 yd. in advance of the No. 2 home signal. The automatic warning system is installed on this line, the inductor being 185 yd. in rear of the Castlecary distant signal. In normal weather drivers get a reasonably early view of all Castlecary signals.

Three-position block instruments are in use. At Dullatur East the Up and Down indicators, working with an adjacent box, are mounted on the same instrument. At Castlecary, the Up and Down indicators are in different cases. The Up starting signal at Dullatur East needs a "line clear" release from Castlecary. It is "one release, one pull," and if the instrument is pegged by the Castlecary signalman to "train on line" before the Dullatur East starter is pulled off, a second release is needed. The signalman at Castlecary cannot peg "line clear" unless his No. 1 home signal is normal and his distant-signal arm proved "on." There is sequential locking between his stop signals, and his starter needs a "line clear" release from Greenhill Junction as above. There are no track circuits in the Up line at Castlecary, and therefore no "Welwyn" control on his block instrument to Dullatur East (this control ensures that before a second train can be accepted, the first train must have entered and cleared a track-circuit at the far end of the section; or an emergency release must be operated).

Visibility deteriorated rapidly after 7.45 a.m., but neither of the drivers concerned expected fog signalmen to be on duty.

The evidence of the signalmen at Dullatur East and Castlecary was flatly contradictory, but neither gave Colonel Robertson any grounds for thinking that he was deliberately lying.

Evidence of Dullatur East signalman

The Dullatur East signalman said that at 7.47 a.m. he offered the E.C.S. train to Castlecary (2-2-1 bells), and that it was immediately accepted (all the bell signals except "train entering section" and, "obstruction danger" were preceded by the "call attention" signal—one bell—as laid down in the regulations). He then pulled off his signals. The train passed at 7.50 a.m., when he sent "train entering section" forward. He saw his block indicator, operated from Castlecary, change from "line clear" to "train on line." He put back his signals, gave "train out of section" to Croy, the box in the rear, and was at once offered and accepted the diesel train. At 7.52 a.m. he had "train out of section" for the E.C.S. train from Castlecary, and saw his indicator change from "train on line" to "line blocked." He at once offered the diesel train (4 bells). It was accepted and his indicator changed to "line clear." He was busy with down trains for a matter of seconds, and then went to pull off his signals for the Up diesel train, after looking at the Up line indicator and seeing it at "line clear." He was able to pull off his two home signals but found the Up starting signal lever locked. He claimed that he then looked at his Up line indicator and saw that it had been changed to "train on line." He first thought that there had been a block failure, and then concluded that the Castlecary signalman had mistakenly thought that he had received "train entering section" for the diesel train and so had pegged "train on line" prematurely. He did not claim that the Castlecary signalman had acknowledged this assumed "train entering section" signal on the bell. He called the Castlecary signalman on the telephone, and said "you are too quick for me. I have not got my starting signal off for the 7.30 a.m. yet." He did not actually ask for a second release, but he was given one, and the Castlecary signalman did not ask any questions. He agreed that he should have used the proper cancelling procedure, but claimed that he acted as he did to avoid delaying the diesel train. He was emphatic that he made it clear that he was referring to the diesel train and that the Castlecary signalman understood this. He then pulled off his Up starter. As the diesel train passed him, he sent "train entering section" to Castlecary and heard it acknowledged. His register showed this signal as having been sent at 7.55 a.m. At 7.58 a.m. he received the six-beat "obstruction danger" signal from Castlecary. On asking what was wrong, he was told that the diesel train had run through the Castlecary signals. He assumed that the signalman there was "not ready for the train."

Evidence of Castlecary signalman

The Castlecary signalman was emphatic that he neither heard nor acknowledged any "train entering section" signal at 7.50 a.m. He did not alter the Up line indicator, which, he said, had remained at "line clear" since 7.47 a.m., when he accepted the E.C.S. train. He also flatly denied sending the "train out of section" signal for the E.C.S. train to Dullatur East at 7.52 a.m. He had neither heard nor acknowledged the "Is Line Clear" signal from Dullatur East for the diesel train. His version of giving Dullatur East the second release for his starting signal was also very different. He said that shortly after offering a down freight train to Dullatur East and having it accepted, the Dullatur East signalman telephoned him and "asked for a re-set on the Up line." He took this to mean that the Dullatur East starting signal was stuck, and was emphatic that no reference was made to any particular train. He assumed that the Dullatur East signalman wanted to clear the signal for the E.C.S. train; no mention was made of the diesel. He confirmed that he gave the second release without demur. He said that he knew the proper cancelling procedure and agreed that it should have been used.

Trains confused

He confirmed that he received "train entering section" from Dullatur East at 7.55 a.m., but thought it referred to the E.C.S. train. He at once got acceptance for that train from Greenhill Junction (the time and the 2-2-1 bell signal were confirmed by the Greenhill Junction signalman). He then cleared his Up line signals—as soon as the E.C.S. train was accepted, he emphasised, and not in response to a whistle. He did not hear any whistle at this time. Shortly afterwards the Greenhill Junction signalman called him to the omnibus telephone, and questioned whether in fact the E.C.S. train, which was running late, was to run ahead of the diesel. The Castlecary signalman said that he called the East Dullatur signalman to the telephone to confirm his reply to Greenhill Junction that this was so. Although the East Dullatur signalman denied

taking part in this conversation, the Greenhill Junction signalman said that he did so, that he recognised his voice, and that he confirmed that the E.C.S. train was running ahead. On this point the East Dullatur signalman said that he overheard the other two talking about the regulation of the trains, but that this was during his re-set conversation with the Castlecary signalman and that he himself said nothing. Two minutes later, the Castlecary signalman said, the E.C.S. train passed his box at slow speed, and he restored the distant, and both home signals, to danger behind it. He had just turned to his register to book the train when he saw the diesel train approaching at speed. He waited a moment, to allow the E.C.S. train to get past the starting signal, and then put that signal back to danger. He sent the " obstruction danger " signal in both directions at 7.58 a.m.

Train register altered

Entries in the train registers at Dullatur East and Castlecary supported the versions given by the respective signalmen. At Castlecary the entries for receiving " train entering section " for the E.C.S. train from Dullatur East and for having it accepted by Greenhill Junction had been altered, by over-writing in ink, from 7.50 to 7.55 a.m. The signalman admitted the alteration, explaining that he had entered 7.50 in error and had then been told indirectly during his conversation with the Greenhill Junction signalman that the correct time was 7.55 a.m. The latter signalman was a bit vague about this, but was certain that he had only once been offered the E.C.S. train, and that was at 7.55 a.m.

Colonel Robertson reported that the Dullatur East signalman was experienced and confident. He was aged 47 and has had 12 years' service as a signalman He had been giving rest-day relief in 11 boxes, with varying types of block instruments. He had relieved at Castlecary, where the Stationmaster had a high opinion of him, saying that he had a keen interest in teaching the younger signalman. The Castlecary signalman was aged 20, and had been a trained signalman for only four months. But the stationmaster spoke highly of him as " a very keen railwayman and a very tidy worker in the box." It was clear from the train register that the Stationmaster had exercised close supervision over him.

Drivers' evidence

The driver of the E.C.S. train described how he had been stopped at Castlecary No. 1 home signal. Because of the weather and because he knew the diesel train to be close behind him, he at once sent his fireman to the signalbox under Rule 55, but the No. 1 home signal was cleared at once. He drew slowly forward to No. 2 home signal, expecting it to be at danger, but began to accelerate when he saw that it was " off." The starting signal was " off " when he first saw it but it was then put back to danger in his face. He closed the regulator but had not time to apply the brake before the collision. He estimated his speed at 15-20 m.p.h.

The driver of the diesel train said that he got the A.W.S. bell to show that Castlecary distant signal was " off." His speed was up to about 55 m.p.h. when he unexpectedly saw the Up home No. 1 at danger. He closed the throttle and began to apply the brakes, but his evidence about the brakes was somewhat confused. The home No. 2 signal was also at danger, but he did not see the E.C.S. train until he was on the viaduct and less than 200 yd. in rear of it. At the moment of impact he estimated his speed at 10 to 15 m.p.h. The two train guards thought that the brake application was no more than normal, but a Travelling Ticket Collector described it as " very severe." Still he was on his feet at the time and was not thrown off balance. Nor, according to other evidence, did it unbalance another passenger who was standing up.

The Castlecary Stationmaster said that he underestimated the gravity of what had happened. Instead of calling for ambulances at once, as laid down in the standing instructions, he went to the scene of the collision. Once there, he misinterpreted a gesture by one of the two doctors who were giving first aid, and so thought ambulances were not needed. They were eventually ordered at 9.15 a.m. and arrived at 9.50 a.m.

Examination of a selection of previous registers showed that the Dullatur East signalman had in other signalboxes, made a number of errors in his bookings, some of them gross. In contrast, the Castlecary signalman's bookings had been very good. The Dullatur East signalman was surprised that he had made these errors, but did not dispute them. Colonel Robertson pointed out that these errors were no proof of irregular block working, but they suggest a slackness of attitude. Irregular booking is also in itself a danger to block working, and can lead to self-deception.

Brake tests

Brake tests showed *inter alia* that at 51 m.p.h. either a partial application 70 yd. short of No. 1 home signal plus an emergency application 70 yd. short of No. 2 home signal, or alternatively an emergency application at No. 1 home signal would stop a diesel train of this type short of the point of impact. At an approaching speed of 54 m.p.h. an ordinary service application 70 yd. short of No. 1 home signal would stop the train in time.

Colonel Robertson analysed the contradictory statements made by the two signalmen. On the immediate point of the second " line clear " release, if the Dullatur East signalman's evidence was correct, the accident would probably have occurred anyhow; for if he had cancelled correctly and belled the diesel train again, the Castlecary signalman would probably have accepted it. But if the latter's evidence is correct, and the Dullatur East starter was locked at 7.52 a.m. because the one pull for which he had released it at 7.47 a.m. had already been used for the E.C.S. train, then the use of the proper cancelling procedure followed by the four bells for the diesel train, or even a proper verbal understanding between the two signalmen on the telephone, would have warned the Castlecary signalman that something was amiss and so have prevented the collision.

Colonel Robertson examined the events leading up to the request for a second release. On the alleged " train entering section " for the E.C.S. train, he accepted the Castlecary signalman's explanation of the alteration in the booking from 7.50 to 7.55 a.m. He commented that if this signalman received and acknowledged this signal, then why did he not immediately seek acceptance of the train from Greenhill Junction at once. On the alleged " train out of section " signal for the E.C.S. train, Colonel Robertson could see no reason at all why the Castlecary signalman should have sent this signal deliberately and no possibility of his having sent it by mistake. Again, if he did send it, why did he not simultaneously send the " train entering section " signal forward ? Also, the Dullatur East signalman did receive a " train out of section " signal at the time, but it was on the down line from Croy signal-box.

Conflicting evidence

On the alleged acceptance of the diesel train by the Castlecary signalman, Colonel Robertson said that if the signalman really did so, his failure to book the acceptance seemed out of character. There was no question that the block indicator in both boxes stood at " line clear " from 7.52 a.m. until 7.55 a.m. The Castlecary signalman claimed that it had so stood since his acceptance of the E.C.S. train at 7.47 a.m. The Dullatur East signalman claimed that it had been changed to " train on line " at 7.50 a.m., to " line blocked " at 7.52 a.m. and then to " line clear " again when the diesel train was accepted by the Castlecary signalman.

On the question of the indicator having been changed from " line clear " to " train on line " before the Dullatur East signalman had pulled off his starter, Colonel Robertson could see no reason why the Castlecary signalman should have done so, particularly as it was two minutes after he had received his last " train entering section " signal, on which he had pegged correctly at the time. But whichever version was correct, the Dullatur East starter would have been locked—in the one case by the premature peg to " train on line," and in the other because the release given had already been used.

If the Dullatur East signalman's version was correct, the Castlecary signalman took a series of positive but irrational actions which he did not record and which he denied taking. Some of them could not be reasonably explained. But if the Castlecary signalman's version was correct, the Dullatur East signalman's actions were at least explicable, partly in the light of his previous slack booking habits and the self-deception to which such habits could lead, and partly in the light of his self-confidence.

Neither of the two versions of events could be proved or disproved. But in Colonel Robertson's view the balance of probability was strongly in favour of the Castlecary signalman's version being substantially correct.

Inspecting Officer's conclusions

The main cause of the accident was the irregular release of the block controls on the Dullatur East starting signal. In asking verbally for this release, instead of adopting the correct cancelling procedure and belling for a second " line clear," the Dullatur East signalman acted irregularly. The Castlecary signalman also acted irregularly in not insisting that the correct procedure was adopted; far worse, he failed in his elementary duty to find out for what train he was giving the second release. The Dullatur East signalman was the older and much more experienced man, and it was he who took the lead in the adoption of the irregular procedure. The younger man, relying on

the other's wider experience, acquiesced without question.

The root cause, in Colonel Robertson's view, was irregular blockworking by the Dullatur East signalman, culminating in his asking for the irregular release. Why he should have done so is a matter for speculation. But on this basis, the Castlecary signalman thought that when he gave the irregular release, it was for the E.C.S. train. Therefore, his contribution to the cause of the accident is limited to his failure to find out for what exactly the release was required, either by insisting on the proper procedure being adopted or by questioning the other signalman until he was satisfied. His failure was a serious one.

In Colonel Robertson's opinion the main responsibility for the collision must be shared between the two signalmen, but by far the bigger share must be borne by the Dullatur East signalman.

Secondary cause

A secondary cause of the collision was the diesel train driver's failure to stop his train as quickly as he should have done. As he had heard the A.W.S. bell at Castlecary distant and had seen the signal was " off," he had a right to expect the " stop " signals to be " off " too, and he was not going too fast. When he saw the Up home No. 1 signal at danger, he should have at once realised that it had been put back in his face for some urgent reason and that there was an obstruction ahead. Instead of braking hard and fast, he only checked the train until he saw Up home No. 2 signal also at danger, and when he then made an emergency brake application, it was too late. The braking tests showed that the train could have been stopped in time.

The driver had not, in Colonel Robertson's view, acted as fast as he should have done in this emergency, but his share of the blame for the collision is less than that borne by the signalmen, and is of a very different kind.

Block controls, Colonel Robertson pointed out, exist to assist signalmen and prevent certain kinds of mistakes that may cause accidents. They did not relieve him of his responsibility for correct block working. Emergency releases are necessary, and these expose the signalman to the particular danger from which the control was designed to shield him. Before resorting to a release, therefore, a signalman must ensure that all is in order and that he is not doing that which the control was specifically designed to prevent. Once he has decided to seek a release, he must seek it correctly. The Dullatur East signalman's excuse for not following the correct procedure when seeking the release was a very bad one. A signalman should certainly try to avoid delaying a train but disobedience of the regulations is not the way to do it.

The Castlecary signalman was young to be in charge of a box on a " very important " line. But his Area and District Inspectors, who had been keeping a careful eye on him, were satisfied that he was fit for the task. A signalman's fitness depends much more on his maturity than on his age in years, and Colonel Robertson did not think that too much was being asked of him. Still his youth made him much more likely to agree without demur to the demand for a release. This makes the Dullatur East signalman's one deliberate irregularity all the more reprehensible. He should have been particularly careful to set a good example to his young and inexperienced colleague.

Welwyn control appropriate

Colonel Robertson said that this collision could not necessarily have been prevented by a Welwyn control; for no controls are proof against deliberate irregularity. But Welwyn control would be appropriate here, and the Regional Officers have agreed to its provision, with associated berth track-circuits, on both lines at Castlecary. Colonel Robertson recommended its early provision on other boxes on this line, where it has not already been provided.

The existence of A.W.S. on this section of the line had no bearing on the accident, as the Castlecary Up distant signal was " off " for the diesel train. But Colonel Robertson derived much satisfaction from the driver's evidence of how much the A.W.S. horn and bell signals had helped him on his journey.

The block irregularities were of the unthinking sort that suggests a habit of bad block discipline, which sooner or later is bound to lead to trouble. There was no sign of slack supervision here, but this case emphasised the importance of the regular and comparative checking of block registers, not least those kept by experienced relief signalmen.

The Stationmaster should have called for ambulances at once, as his instructions laid down. After an accident it is wiser to assume at once that ambulances will be needed rather than wait until the need has been established.

Electronic computers on London Midland Region

The London Midland Region of British Railways has recently completed a two-year re-equipment programme in its Hollerith machine bureau at Derby. The introduction of five electronic computers and nearly 80 ancillary machines has resulted in considerable staff economies and a record output of work ranging from cost analysis to clothing orders.

The bureau is now the largest electronic installation of its kind on British Railways and one of the largest in commercial use in the country. It has attracted visitors from major industrial firms in Britain and from many foreign railway administrations, including those of France, Southern Rhodesia, India, Egypt and South Africa.

The present equipment has cost about £250,000 but already, in terms of time and staff, it is resulting in a saving of roughly £60,000 a year, and further savings and greater efficiency are confidently predicted. At the same time this equipment affords the opportunity to develop a figure service for managerial purposes which could not have been tackled by orthodox clerical methods.

Compiles payroll

The computers are Hollerith type 555 electronic calculators, and these work at the rate of 15,000 calculations a minute. They add, multiply, divide or subtract, and, if necessary, compare one set of figures with another. It takes one millisecond to perform a simple addition. One of the biggest jobs taken over is compiling the payroll for more than 25,000 staff, including those at the Derby locomotive works and the carriage and wagon works, outstations and various other departmental offices in Derby. Basic details such as rates of pay, hours worked and tax liability are fed into the computers on punched cards, and each machine works out the contents of pay-packets at the rate of 2,000 an hour.

When applied to the intricacies of stores accounting, the computers keep track of daily movements in a catalogue of more than 84,000 items—worth over £6 million—ranging from split pins to diesel power units. They keep a record, too, of average price-rates and note any which have increased by more than 10 per cent; and they also warn

Electronic computers at Derby in the London Midland Region

if any type of article in stock falls below the minimum quantity required.

A task of wider scope which the computers take in their stride is compiling orders to clothing manufacturers for uniforms for the whole of the London Midland Region. They also earn money by dealing with the payroll of a Midlands bus company.

Day excursions to Paris, Brussels and Ostend

The North Eastern Region of British Railways is running day excursions to the French and Belgian capitals and day outings to Ostend. The excursions are available from selected stations in the Region, on Mondays, Tuesdays and Wednesdays, until September 6, 1961. Although valid passports are required by passengers to Brussels and Ostend on the trip to Paris excursionists need not carry a passport. They require only an " identity card " which is issued free by British Railways. Bookings must be made 14 days in advance when three passport photographs should be submitted for affixing to the " identity card." Where valid passports are held these should be used in preference.

The outward journey is by the 1.28 p.m. train from Newcastle to Kings Cross, calling at Darlington and York with connecting services from Sunderland, West Hartlepool, Stockton and Middlesbrough Stations, also by the 3.12 p.m. train from Bradford (Exchange) to Kings Cross, calling at Leeds (Central) with connecting services from Halifax, Harrogate, Hull and Goole. Excursionists have 16 hours in Paris, 19 hours in Ostend, and 14 hours in Brussels.

Transport of concrete pipes

The London Midland Region of British Railways is transporting 17,000 tons of prestressed-concrete pressure pipes from Stanton Ironworks, near Ilkeston, Derbyshire, to the Bristol area in connection with the Bristol Waterworks Company's Sharpness Abstraction Scheme which will supply water to the new I.C.I. works at Severnside, near Avonmouth, and also to the Bristol area domestic water supply. The operation, which is expected to continue until the end of the year, is considered to be the most important of its kind yet undertaken.

Three special trains a week are carrying the pipes from the works to three different stations in the Bristol area—Berkeley Road, Pilning, and Thornbury. There they are unloaded by the contractors for the Sharpness Scheme and distributed along the route from Purton where the water will be drawn out of the Gloucester and Sharpness Canal to Severnside and Bristol, a distance of 16 miles.

Each train consists of 55 special wagons each of which carries two of the 30-in. or 36-in. pipes. They are carried side by side packed with wooden scotches and rubber mats. The method of packing is so successful that no damage in transit has occurred.

Each 30-in. pipe, 15 ft. in length, weighs 2 tons 10 cwt. or 3 tons 1 cwt. depending on whether they are single- or double-wound. The 36-in. pipes of the same length have a weight of 3 tons 6 cwt. or 4 tons respectively.

The special trains are made up at Stanton Gate from rafts of wagons passed out from the Stanton Ironworks private sidings and go to Cheltenham, Gloucester, or Sharpness, where if necessary they are held until wanted at any of the three unloading stations. An additional 1,500 tons of 30-in. diameter pipes from Stanton is to be taken by rail for stockpiling at Bristol Wapping Wharf.

The illustration shows prestressed-concrete pipes being loaded for despatch.

Modernisation of Gateshead Greensfield Motive Power Depot

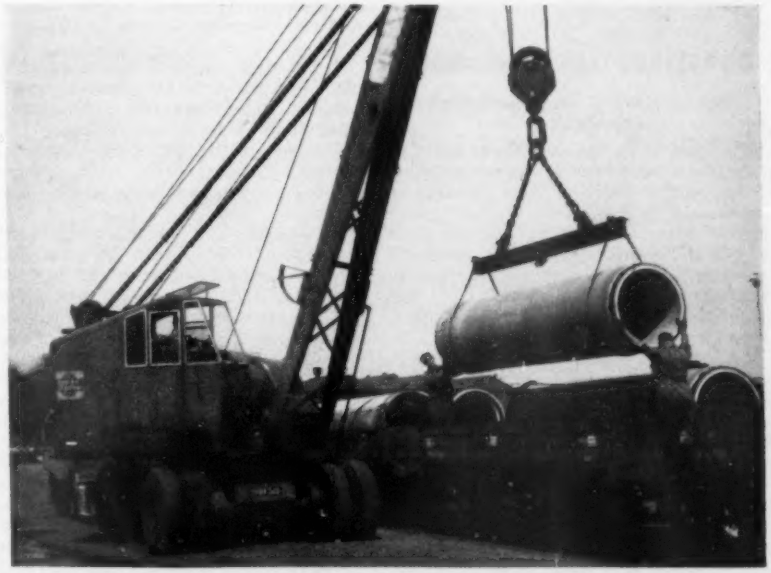
To fit Gateshead (Greensfield) Motive Power Depot to deal with diesel-electric locomotives, modernisation was begun in 1956. Two of the four roundhouses were re-roofed and one roundhouse abandoned. A further stage of modernisation is now being undertaken to provide the essential services and modern facilities for the reception of diesel electric locomotives. A depot building has been provided to house modern offices, staff amenities, a machine shop, stores, central heating and water softening plant. For the initial period, while steam locomotives continue to occupy the main part of the shed, maintenance and repair facilities for diesel locomotives are being provided as a separate screened off section within the main shed.

The diesel locomotive maintenance section occupies part of one of the shed's three roundhouses. In order to separate the diesel and steam sections, the diesel section is fully screened to form a temporary self-contained enclave within the main shed. In this way, provision is made for progressive future extensions. There are two roads, 230 ft. and 160 ft. long, with room for five Type 4 (2,000 h.p.) diesel-electric locomotives. Seven ft. high raised concrete platforms and 1 ft. 6 in. deep centre-pits with rails raised 2 ft. 6 in. above the shed floor allow access to the locomotive for maintenance at three levels. Cold-cathode overhead strip lighting is installed and there is auxiliary-filament lighting in the inspection bays. Central-heating pipes are fitted in the inspection bays and radiant heating panels are embodied in the raised platforms. There is a combined service duct situated under the concrete floor. This duct, in addition to carrying the high and low voltage electric power cables, compressed air line, soft water pipes and central heating pipes, also carries the pipes conveying sump lubricating oil (new and used) between storage tanks and oil changing berths. Used sump oil recovered from engine sumps is pumped into three 10,000-gall. storage tanks and used for burning in the central space-heating boilers.

Three exterior fuelling points are provided, two at the entrance to the main shed and another in the locomotive sidings. Each has a fuel dispenser and a dispensing point for soft water for the train-heating boilers on the locomotives. The dispensers are covered by concrete weather canopies. An underground pipe system connects the fuelling points with seven 7,000-gall. fuel-oil storage tanks mounted within a bund wall at one side of the locomotive sidings. The fuel tanks are fed by rail tank cars from a special siding.

Ancillary facilities

The remainder of the building comprises stores, machine shop, central heating boiler, and soft water plant. The machine shop is provided with a number of small ancillary shops including an injector test room (fitted with an air-conditioning unit providing warm dust-free air); a battery-charging and storage room; a parts and filter-cleaning room; a water treatment plant (with a 20,000 gall. overhead storage tank), and offices for the Mechanical Foreman. The low pressure hot water heating installation is served by two shell type boilers arranged for oil firing. The oil burners are capable of burning recovered sump oil or crude fuel oil. The heating system is divided into two separate circuits, one to serve the office building and the other the repair sheds. This has been designed so that no noise will be transmitted to the office building by the high velocity circulation system employed. A hot



Loading concrete pipe into a specially-fitted wagon at Stanton Ironworks Derbyshire

water service has been provided through a calorifier, connected to the heating system.

The contractors for the building of the diesel section were R. Costain Limited, and the staff amenities, offices, etc. are being constructed by J. S. Rutherford & Sons Ltd. The building work is being carried out under the direction of the Chief Civil Engineer, and equipment installations under the direction of the Chief Mechanical & Electrical Engineer, North Eastern Region of British Railways.

Canadian Incentive Freight Rates

The new incentive freight rates applied jointly by Canadian National and Canadian Pacific Railways will cover all classes of freight except those not suitable for pick-up and delivery, such as perishables, explosives, livestock, and bulk freight. Bulky commodities will be subject to a higher incentive rate.

The rates will apply to traffic between stations where pick-up and delivery service exists at point of origin or destination. They will provide for successively decreasing charges on increasing sizes of shipments and the plan is designed to provide a more competitive pick-up and delivery service between principal points in Canada's central provinces.

Shipments of 750 lb. and more will derive maximum benefit from the rates. As an example, tyre cord which now moves between Montreal and Kitchener, Ontario, at $2·15 per 100 lb., will have a rate of $1·99 per 100 lb. if the shipment is between 750 and 2,000 lb. Between 2,000 and 5,000 lb. the rate will drop to $1·84 and go down to $1·73 for shipments weighing between 5,000 and 10,000 lb. Over 10,000 lb., the rate will be $1·56 per 100 lb.

A mixing rule will be instituted to encourage larger shipments. This rule enables a shipper to benefit from one combined consignment of assorted commodities which, if individually shipped, would be subject to higher rates. Under the mixing rule, each commodity in the combined shipment will be rated as if it was being shipped at the total weight of the mixed consignment.

Questions in Parliament

Reconstruction of Euston Station and Underground

Sir Frank Markham asked the Minister on July 12 whether he had approved the British Transport Commission's plans for the reconstruction of Euston main line and underground stations; what was the estimated cost of this scheme; and whether it included provision for the removal of the historic buildings, including the Doric Arch, the preservation of which was recommended by the Royal Fine Arts Commission.

Mr. Marples said in a written answer that he had given approval in principle to the early reconstruction of the Euston main line and Underground stations, which was made necessary by the main line electrification and by increased traffic demands.

This scheme was urgent not only because of the electrification programme, but because the Underground lifts had almost reached the end of their useful life. The Underground scheme would cost about £700,000, but a detailed estimate was not yet available for the much more extensive work involved in the main line station reconstruction.

All possible ways of preserving the historic buildings *in situ* had been considered by the British Transport Commission and by independent advisers, but they had been forced to the conclusion that the operational requirements made this impracticable. The possiblity of moving the Doric Arch to another part of the site had also been examined by the Commission and by the expert advisers to the Minister of Works. They estimated that the cost of dismantling and re-erecting the arch alone, without its flanking lodges, would be about £190,000 as compared with £12,000 for simple demolition. The arch weighed about 4,500 tons, and to brace it and remove it on rollers would cost even more.

The Government had decided that the preservation of the arch did not justify expenditure of this order. This decision had not been reached without regret at the passing of a major monument of the early railway age, but there was no practicable alternative. The Commission had accordingly been informed that they might proceed on this basis.

Staff & Labour Matters

Claim for shorter hours

The claim of T.S.S.A. for a five-day 38-hr. week for all railway salaried staff was heard by the Railway Staff National Tribunal on July 12. The Chairman of the Tribunal was Mr. Roy M. Wilson, President of the Industrial Court. The other two members were Sir Richard Snedden and Mr. R. Willis.

The case of T.S.S.A. was presented by Mr. W. J. P. Webber, General Secretary of the Association, and was based on the following main arguments:—

1. The case for railway salaried grades is quite separate and distinct from that for the conciliation grades.

2. A maximum of 38 hr. is necessary to provide equity as between all sections of salaried staff.

3. This principle of equity has been recognised by the Railway Staff National Tribunal in connection with Bank Holiday arrangements which are now the same for all salaried staff.

4. The staffs who at present work 42 hr. generally have the more uncongenial turns.

5. On a comparison with similar staffs in other industries the claim is justified.

The reply of the British Transport Commission was given by Mr. A. R. Dunbar, Manpower Adviser, and rested on the following points:—

1. Concession of the claim would lead to a reduction of 4 hr. a week for some staff, between 2 and 4 hr. for other staff, and periods up to 2 hr. for certain others. This would mean a greater reduction than was contemplated for railway wages staff or than had been conceded in the country generally.

The only justification for a reduction in standard weekly hours was in the reduction of two hours conceded in the country generally.

2. In reply to claims from the N.U.R., A.S.L.E. & F. and T.S.S.A. for a 40-hr. week for wages staff and a 38-hr. week for salaried staff, the Commission had offered to consider a reduction of 2 hr. a week provided that ways and means could be found to reduce the impact of shorter hours and keep the cost within reasonable limits. They had proposed that a joint working party should be set up to examine the matter and the N.U.R. and A.S.L.E. & F. had signified their agreement to this. The N.U.R. who jointly represented salaried staff and were parties with T.S.S.A. to the original claim for a 38-hr. week were not supporting T.S.S.A. in its submissions to the Tribunal.

3. The fact that certain salaried staff by long-established practice and having regard to the nature of its duties is not called on to work the full standard weekly hours is no justification for the remaining staff receiving a greater reduction in hours than is contemplated for other railway staff or conceded in outside industry.

4. The Guillebaud Committee took hours of duty (including uncongenial turns) into consideration in assessing the relativity of railway pay one grade with another and with that in outside industry.

5. The cost involved, not only in regard to this claim but in the consequential effect on other sections of the staff is not one which the Commission can reasonably be called on to bear.

The Commission's advocate stated that the case was regarded as one of the very highest importance and he asked the tribunal to award against the claim in its entirety, which would enable the Commission in conjunction with the trade unions concerned to consider ways and means of implementing a two hours reduction in the standard week on the basis of their original offer.

The decision of the tribunal is awaited.

Central Transport Consultative Committee

At its meeting on July 11, the Central Transport Consultative Committee recommended that on the Barnard Castle/Penrith line all train services should be withdrawn and the line closed. In the case of the Colne Valley line, it was recommended that the line should be closed between Haverhill and Yeldham, and that the passenger train service on the remaining portion of the line should be withdrawn.

It agreed to the withdrawal of all passenger train facilities, on the former Midland & South Western Jct. line and the closure of certain portions of the line. This will, *inter alia*, result in the ordinary passenger train service between Savernake and Marlborough ceasing to run, though Marlborough College specials, and freight trains to Marlborough Town, will continue to use the line.

A decision on the proposed withdrawal of the passenger train service between Oxford and Fairford was deferred for further consideration by the Area Committee.

Ribble Motor Services Limited

At the forty-second annual general meeting of the Ribble Motor Services Limited held on July 6, Mr. R. P. Beddow, Chairman, stated that the past year had not shown an improved balance compared with that of the previous year, which had been one without the burden of a wage increase.

He also said that the industry disagreed with the recommended method of subsidising operators of unremunerative rural services contained in the report of the Jacks Committee.

CONTRACTS AND TENDERS

Rail electrification renewal contract on Southern Region

The British Transport Commission has awarded a contract worth £105,000 to Associated Electrical Industries Limited for the renewal of existing power feeders on five sections of Southern Region tracks in the Brighton and Sevenoaks areas.

The contract involves the supply, supervision of the laying, and jointing of 33-kV. 3-core oil-filled cable, with aluminium conductors and corrugated aluminium sheath.

The work will be carried out by A.E.I. Construction (Cables & Lines) Division. The cable will be manufactured by A.E.I. Cable Division at its Gravesend works.

Brookhirst Igranic Limited, of the Metal Industries group, is to supply Strachan & Henshaw Limited with five sets of marshalling equipment worth £50,000 for Richard Thomas & Baldwins Limited, Spencer Works at Llanwern, near Newport, Monmouthshire. They will control the automatic handling of railway wagons.

The order reported last week for Matisa equipment by the Brazilian National Railways, has been placed with an associate organisation: Materiel Industriel, S.A., Switzerland.

British Railways, Scottish Region, has placed the following contracts:—

Tannoy Products Limited: supply and installation of loud-speaker equipment at Perth Marshalling Yard

Laird Brothers: renewal of arch ring on Killiecrankie Viaduct

British Insulated Callender's Construction Co. Ltd.: provision of yard lighting towers, at Millerhill Marshalling Yard

British Railways, North Eastern Region, has placed the following contracts:—

Pelapone Engines Limited: provision of standby alternator sets for Heaton and Benton power houses

W. Clark & Company: construction of heating ducts and tranship Gantry foundations at Newport Marshalling Yard

Cawood Wharton & Co. Ltd.: construction of offices and stores and reconstruction of a building as a boilerhouse at Holbeck Motive Power Depot, Leeds

Yorkshire Hennebique Contracting Co. Ltd.: provision of a new signalbox and compressor house at Hessle Road, Hull

Ingersoll-Rand Co. Ltd.: provision of compressed air equipment for the new signalbox at Hessle Road, Hull

Ashwell & Nesbitt Limited: provision of a heating installation at the Road Motor Engineer's Garage, Valley Road, Bradford

G. Greenwood & Son Ltd.: supply and delivery of pre-stressed concrete deck units for bridge No. 134 at Yarm

The Pavior Construction Co. Ltd.: repair of roads in the York district

The Turnerised Roofing Co. Ltd.: "Turnerising" of the roofs over platforms 4 and 8 at Huddersfield

Edgar Gadie Limited: new toilet accommodation at Kirkgate Goods Depot, Wakefield

The Terrazzo & Tile Co. (Newcastle) Ltd.: installation of ceramic tile paving in the Yardmaster's Office at Newport Marshalling Yard.

British Transport Commission (South Wales Docks) has placed the following contracts:—

Fairfield Shipbuilding & Engineering Co. Ltd.: drydocking and repairing middle gates, Queen Alexandra Dock Lock, Cardiff

G. Percy Trentham Limited: resurfacing of quay, North Side, Queen Alexandra Dock, Cardiff

Thos. W. Ward Limited: provision of machinery, Central Workshops, Cardiff Docks

Associated Electrical Industries Limited: supply of l.t. cable for General Cargo Quay, North Side, Queen Alexandra Dock, Cardiff.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Pakistan:

Covered electrodes for general repair work.

The tender No. is P5/ACST/EB4/31/61. The closing date is August 16, 1961. The Board of Trade reference is E.S.B./22850/61.

2 sets (in 16 pieces), heavy heat-resistant cast hearth plates, suitable for G.W.B. electric furnace No. 1633.

The tender No. is P3/HA/21/61. The closing date is August 28, 1961. The Board of Trade reference is E.S.B./22823/61.

2,800 lamps MFGF, clear 32V, 250W. screw cap

7,200 lamps MFGF clear, 32V, 15W, E.S. cap.

The tender No. is P3/HB1/17/ACST/61-62. The closing date is August 8, 1961. The Board of Trade reference is E.S.B./22822/61.

200 clocks, 12 in. diameter with pendulum and keys.

The tender No. is P4/GB8/114/61/ACST. The closing date is August 7, 1961. The Board of Trade reference is E.S.B./23001/61.

The issuing authority for the above tenders is the Chief Controller of Stores, Pakistan Eastern Railways, Pahartali, Chittagong, to whom bids should be sent.

40 tons ticket board, yellow, 27½ in. x 38 in.

The issuing authority is the Chief Controller of Purchase, Pakistan Western Railways, Empress Road, Lahore, to whom bids should be sent. The tender No. is P-264/P5/D4-61. The closing date is August 3, 1961. The Board of Trade reference is E.S.B./23002/61.

From Sudan:

10 sets of Kelbus re-railing ramps
30 hydraulic traversing jacks
12 screw traversing jacks
12 shoot lift screw jacks
12 prop pullers.

The tender No. is 2412. The closing date is August 21, 1961. The Board of Trade reference is E.S.B./23061/61.

1 heavy-duty, motor-driven, shearing and punching machine.

The tender No. is 2403. The closing date is August 7, 1961. The Board of Trade reference is E.S.B./23063/61. The issuing authority for the above tenders is the Office of the Controller of Stores, Sudan Railways, Atbara, to whom bids should be sent.

From Korea:

70 items of railway and electrical equipment, including boiler-plates and tubes, tyres, ingots, valves, ties, steel plates, lamps, transformers, capacitors, insulators, relays, switches and vacuum tubes.

The issuing authority is the Office of Supply, Government of the Republic of Korea, Seoul, Korea, to whom bids should be sent. The closing date is August 9, 1961. The tender No. is KFX-85. The Board of Trade reference is E.S.B./23071/61.

From Thailand:

400 all-steel four-wheel covered goods wagons
150 four-wheel cattle wagons
100 four-wheel salt wagons
14 bogie tank wagons.

The issuing authority is the Stores Superintendent, State Railway of Thailand, Bangkok, to whom bids should be sent. The closing date is October 30, 1961. The Board of Trade reference is E.S.B./22454/61.

From South Africa:

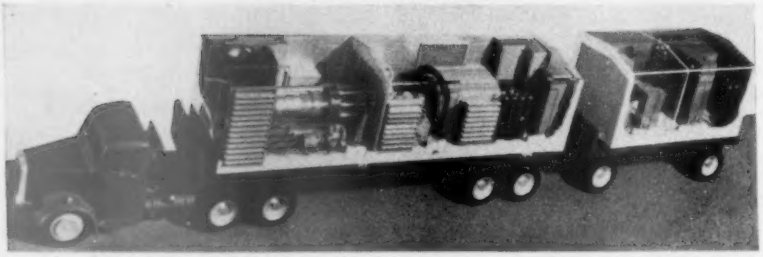
550 eight-day tachographs, in accordance with Specification 21/1961
10,000 pkts. 8 diagram charts
15,000 pkts. 8 diagram charts
20,000 pkts. 8 diagram charts
12 copies of the installation instructions and literature for the operation and maintenance of the tachograph equipment.

Tools to make up various lengths of flexible drives. (List of tools offered to be detailed in a covering letter.)

The issuing authority is the Stores Department, South African Railways, and tenders should be sent to the Chairman of the Tender Board, S.A.R., P.O. Box 7784, Johannesburg. The closing date is August 11, 1961. The tender No. is F.8739. The Board of Trade reference is E.S.B./22481/61.

***Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch** (Lacon House, Theobald's Road, W.C.1).*

NOTES AND NEWS



Bristol Siddeley turbo-generator loaded on a standard road transporter

Accident at Weeton. Six people were killed and 125 injured when a six-car diesel multiple-unit train ran into a stationary ballast train at Weeton, near Blackpool, on July 16. The driver of the diesel train was among those killed.

British Institute of Management conference. The 1961 National Conference of the British Institute of Management is to be held in Torquay from October 24-26. Mr. S. P. Chambers, Chairman, Imperial Chemical Industries Limited, will open the conference.

Elbourne Memorial Lecture. The British Institute of Management seventh Elbourne Memorial Lecture will be given by Field-Marshal the Viscount Slim at the Connaught Rooms, London, at 6.30 p.m. on November 8. The subject which Viscount Slim has chosen is " Leadership."

Diesel Engineers & Users Association. The annual report and accounts of the Diesel Engineers & Users Association show that the association's affairs are reasonably satisfactory but for this condition to be sustained it is vitally important that numerical strength should be maintained.

Krauss-Maffei A.G. dividend. The West Germany heavy - engineering company, Krauss-Maffei A.G., which makes locomotives, buses, heavy engines, and general machinery, has recommended a dividend of 10 per cent for 1960 as against 9 per cent previously.

J. Stone (Holdings) group at New Delhi. The J. Stone & Co. (Holdings) Ltd. group will exhibit a combined display, partly of photographs and partly of products, at the Indian Industries Fair to be held in New Delhi at the end of this year. The products will include an electric railway pantograph and other electric railway equipment.

Industrial water and effluents. The Society of Chemical Industry is to form a subject group under the Chairmanship of Dr. B. A. Southgate, Director of the Water Pollution Research Laboratory, to interest itself in the science and technology of treatment, conservation, and the economic use of water, and the treatment and disposal of effluents. The group will be known as the " Industrial Water and Effluents Group."

Driverless train. An electronically-controlled driverless train has been successfully tested on the Moscow underground.

Bristol Siddeley in India. Illustrated above is a mobile 3 MW turbo-generator built by Bristol Siddeley Engines Limited which will be on display at the Indian Industries Fair in New Delhi from November 14 to December 31. The equipment is suitable for loading on to a standard road transporter as illustrated or on to a railway flatcar.

Ferodo factory in Caernarvonshire. The Chairman of Turner & Newall Limited, Mr. R. Soothill, laid the foundation stone of a factory for Ferodo Limited, a member of the Turner & Newall group, at Griffiths Crossing in Caernarvonshire on July 17.

Naming of rms. Victoria. The East African Railways & Harbours latest addition to its Lake Victoria Marine Services will be named *Victoria* by Lady Renison, wife of His Excellency, the Governor of Kenya, on July 22. After the ceremony the vessel will sail on an inaugural voyage during which a portrait of Queen Victoria will be unveiled. The illustration below shows part of the first class lounge.

Glasgow holiday trains. The Scottish Region of British Railways ran 400 special trains for the commencement of the Glasgow holiday period last week-end.

Molyslip distributors. Monks & Crane Limited is to be sole industrial distributor for Molyslip products.

Cleethorpes Station. The Eastern Region of British Railways has reconstructed Cleethorpes Station and, on July 14, it was officially opened by Mr. G. F. Fiennes, Line Traffic Manager, Great Northern Line.

English Electric Indian exhibit. Among the products of English Electric Co. Ltd. to be exhibited at the Indian Industries Fair in New Delhi later in the year will be railway locomotion equipment in service in India.

Increased use of car ferries. The Southern Region of British Railways and French Railways have carried nearly 27 per cent more cars this year on their cross-Channel car ferries. The increase in the number of motorists taking their cars to the Channel Islands is even greater.

Withdrawal of Freight Service. The Eastern Region of British Railways is to withdraw the freight train service from Kirby Cross Station, situated on the Walton-on-Naze branch line from July 31.

Railway pay discussion. The Chairman of the British Transport Commission, Dr. Richard Beeching, has agreed to discuss railway wage and salary increases with the three railway unions at a special meeting of the Railway Staff Joint Council on August 21.

Railway signal company formed. The General Railway Signal Company and Nederlandsche Standard Electric Mij.N.V., a subsidiary of the International Telephone & Telegraph Corporation, have formed a company called

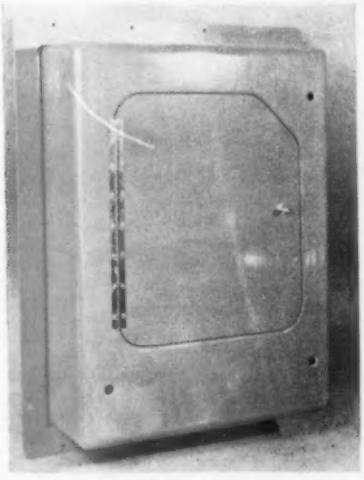
Part of the first class lounge on rms. "Victoria"

Algemene Sein Industrie, N.V., with headquarters at The Hague. The new company is to manufacture and market electronic and electric railway signalling and control systems and devices.

H. W. Kearns & Co. Ltd. at Brussels exhibition. Models from its range of horizontal boring machines will be exhibited by H. W. Kearns & Co. Ltd. at the 7th European Machine Tool Exhibition in Brussels from September 3-12.

Awards for A.E.I. film. The Associated Electrical Industries Limited film "Electron microscopy—an introduction," won second prize in the Scientific Research in Industry category at the Second International Industrial Film Festival in Turin, as well as three special awards.

Plastics on the Southern Region. Reinforced glass-fibre plastics are replacing metal for destination box covers of new diesel locomotives on the Southern Region of British Railway. This material eliminates the problem of condensation inside the box, which,



Plastic destination box cover

by corroding the white paint used as a reflection surface, proved one of the major disadvantages of metal. The covers were moulded by Vitesta Limited, a subsidiary of Vitafoam Limited. Indicator mechanism is being fitted by Transport Engineering & Equipment Limited. One of the covers is illustrated above.

Combined Electrical Manufacturers Limited. Combined Electrical Manufacturers Limited, a holding company formed to effect the merger of Hackbridge & Hewittic Electric Co. Ltd. and Switchgear & Cowans Limited, has announced a final dividend of 8½ per cent to make 12½ per cent in respect of its first period to March 31, 1961.

Railway in British Columbia. The Northern Pacific Railway, promoted by the Wenner Gren (B.C.) Development Company and certain British interests to build a 700-mile railway in northern British Columbia, has been ordered by the Government of British Columbia either to start preliminary work or file the full plans by November 1. The company has accepted this ultimatum and will go ahead with the $300-million project.

Holiday express tour. The Eastern Region of British Railways is to run a holiday express tour train during Sheffield and Chesterfield holiday weeks as in previous years.

Lorry driver of the year. The prizes for successful drivers in the competition to find the lorry driver of the year, organised by the Metropolitan & South East Area of the Road Haulage Association on July 23 will be presented by Miss Sheila Van Damm.

Lancashire - Yorkshire motorway. The Minister of Transport has authorised the County Councils of Lancashire and the West Riding of Yorkshire as Agent Authorities to make a preliminary survey of the line of route of the proposed Lancashire-Yorkshire motorway.

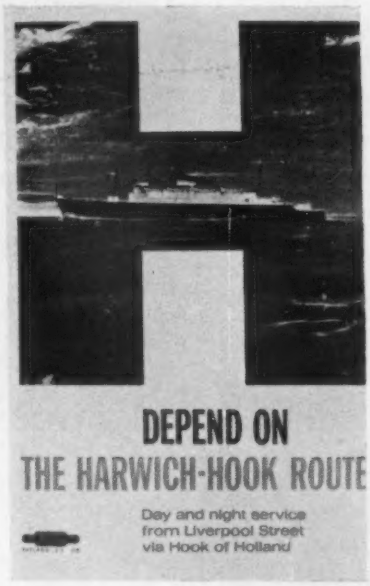
Walsden Station to close. The London Midland Region of British Railways has announced that Walsden Station, between Rochdale and Todmorden, will be closed for passenger and parcels traffic and converted to an unstaffed goods and coal depot on and from August 7.

Height and design of chimneys. The Air Pollution Panel of the Federation of British Industries has published a handbook containing recommendations as to the height and design of chimneys for industrial-boiler plants with an output of 5,000–33,000 lb./hr. steam at maximum continuous rating.

Replin. A fabric made by British Replin Limited is to be used for seat furnishing on the four new Trans-Europe express trains commissioned by the Swiss Federal Railways. The illustration below shows the interior of one of the coaches.

Schoolboys visit L.M. Region. A party of public schoolboys have been visiting installations in the East Midlands area of the London Midland Region of British Railways. The programme, which was for the benefit of boys seeking industrial employment, involved visits to operating installations, Crewe Works and electric traction depot, engineering works. A film show and discussions were also included.

EASTERN REGION PUBLICITY



Boat train poster issued by the Eastern Region of British Railways

Bombs halt rail traffic. Rail traffic between Italy and the rest of Europe virtually came to a standstill when South Tyrol terrorists blew up tracks and electric wiring on the three main-line passes to Switzerland and Austria: the Simplon, the Gotthard, and the Brenner.

Luncheon for railwaymen civic dignitaries. Five active and one retired railwaymen who have been elected to civic office were entertained by Mr. H. C. Johnson, General Manager of the Eastern Region of British Railways recently. They were: Alderman C. R. Williams, Mayor of Hornsey; Councillor C. W. Swift, Mayor of Peterborough; Councillor W. A. Ogden, Mayor

Replin seat covers on the Trans-Europe express

Multi-purpose diesel-electric locomotive for the New York Central Railroad

of Grantham; Councillor H. Potter, Mayor of Wisbech; Alderman T. H. Wright, Mayor of Doncaster, and Alderman W. G. Cutbush, now retired, Sheriff of Norwich.

Locomotives for N.Y.C.R. The accompanying illustration shows one of 15 diesel-locomotives built for the New York Central Railroad by Alco Products Inc. The locomotives are of 2,000 h.p. with a 12-cylinder engine.

NORTH EASTERN REGION PUBLICITY

New publicity poster issued by North Eastern Region, British Railways

Scarborough-Bridlington Sunday service. The North Eastern Region of British Railways has augmented the Sunday service between Scarborough and Bridlington by an additional train from Scarborough at 11.35 a.m. calling at Filey, Hunmanby, Speeton, Bempton, and Flamborough.

Desoutter Group at Farnborough. On Stand No. 248 at the S.B.A.C. Exhibition at Farnborough on September 4–10, the Desoutter Group will show a complete range of tools and a selection of pneumatic cylinders and controls from Lang Pneumatic Limited, and photographs of machinery produced by Carter Stevens (Automation) Limited, two members of the group.

London Midland Region Mayors. Railwaymen who have been chosen as Mayor of their respective towns were entertained to lunch by Mr. David Blee, General Manager of the London Midland Region of British Railways on July 14. They were Councillor H. Kent, Mayor of Crewe, who is a Controller in the Line Traffic Office, Crewe, and Councillor F. W. Marshall, Mayor of Leyton, a signalman at Kentish Town.

Railway Stock Market

Uncertainty about the Chancellor's coming economic measures overshadowed markets.

Very little business has passed in foreign rails where in many cases quotations were hardly tested by business. Costa Rica ordinary stock remained at 41½, but the 6½ per cent first debentures lost a point at 95½. Business at 58 was recorded in Guayaquil & Quito assented bonds and Chilean Northern 5 per cent first debentures were again 50. Paraguay Central prior debentures again showed business at 18½. Brazil Railway bonds were 3¾.

Antofagasta ordinary stock, however, has featured with a rise of a point at 18½, but the preference stock remained at 34, at which there is a yield of over 14 per cent; the 4 per cent perpetual debentures were 39½. San Paulo Railway 3s. units have been active around 2s. 1½d. and United of Havana second income stock was better at 6½. Mexican Central "A" bearer debentures were 59. International of Central America shares remained at $19½ and the preferred stock at $103½.

Canadian Pacifics have come down from $46½ a week ago to $43¾. The preference stock lost 1¼ to 54, and the 4 per cent debentures were fractionally lower at 53. White Pass shares eased to $11⅜. West of India Portuguese capital stock gained a point at 116½ and Barsi Light Railway was again quoted at 17.

In the engineering section the general market trend was reflected closely among leading shares such as Vickers, which fell further on balance from 31s. 3d. to 30s. 3d. and Stone-Platt were 50s. 6d. compared with 53s. 6d. a week ago. Ruston & Hornsby lost 1s. 3d. at 24s. 3d. and elsewhere, T. W. Ward came back to 70s. compared with 74s. 6d. a week ago. Moreover, Babcock & Wilcox fell 2s. at 27s. 9d. and Clarke Chapman 1s. 6d. at 42s.

Beyer Peacock 5s. shares were 6s. 6d. compared with 7s. 3d. a week ago, and Charles Roberts were 6d. down at 6s. 6d. Birmingham Wagon, however, rallied on balance from 22s. 9d. to 24s. North British Locomotive at 6s. 3d. were virtually the same as a week ago, and Wagon Repairs 5s. shares steady at 21s. 6d.xd, though Gloucester Wagon 10s. shares eased from 8s. 9d. to 8s. 6d.

Electrical shares reflected the further setback in markets, A.E.I. being 36s. 6d. compared with 38s. 6d. a week ago, while G.E.C. eased from 32s. 3d. to 32s. and English Electric came back from 32s. to 30s. 9d. B.I.C.C. were 1s. down at 56s. 3d. Ransome & Marles 5s. shares were 14s. 9d. ex rights to the new shares which were 8½d. premium over the issue price. Pollard Bearing 4s. shares were little changed at 37s. British Oxygen 5s. shares came back sharply to 20s. 6d.xd, but Tube Investments, after falling to 67s. showed a small rally to 68s. 6d. Pressed Steel 5s. shares were 20s. 3d. compared with 20s. 7½d. a week ago. Dowty Group 10s. shares receded from 34s. 1½d. to 32s. 10½d. with the general market trend, and Leyland Motors came back from 93s. to 92s. 3d.

Forthcoming Meetings

July 22 (*Sat.*). Railway Canal & Historical Society, West Midlands group. Visit to Coalbrookdale area.

July 23 (*Sun.*). The Railway Enthusiasts' Club, North Lincolnshire area tour from Doncaster.

July 29 (*Sat.*). The Permanent Way Institution, London Section. Visit to Colchester Station reconstruction and Harwich Ferry terminus.

August 26 (*Sat.*). The Railway Enthusiasts Club, tour of interesting lines in the London area. Open to non-members.

Sept. 2 (*Sat.*). Permanent Way Institution, London Section. Visit to Southampton Docks.

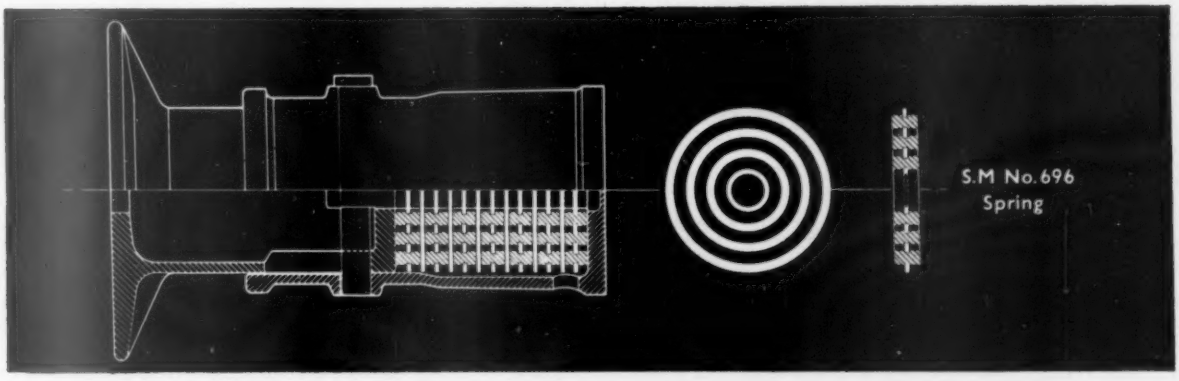
Sept. 16 (*Sat.*). The Permanent Way Institution, East Anglia Section, visit to Permali Limited, Gloucester.

Sept. 16 (*Sat.*). The South Bedfordshire Locomotive Club, special train over the freight-only, Welwyn Garden City to Hertford branch.

Sept. 21 (*Thu.*), The Model Railway Club, film show, at Keen House, Calshot Street, N.1.

Say 'rubber springs'

and you've said



Spencer Moulton *The buffer spring depicted here is a Spencer Moulton product adopted by the SNCF many years ago as their standard for the Unifié Buffer. The spring has been more recently adopted by the Interfrigo Société Cooperative for their latest rolling stock and it is also used on the British Train Ferry Services. It is typical of the design and development work undertaken by the Spencer Moulton organisation for the railways of the world. If you have problems concerning buffer, draw and auxiliary bearing springs, vestibule gangway springs, bogie centre pads, suspensions or any application of rubber, or rubber bonded to metal, please write to us for literature or advice.*

GEORGE SPENCER, MOULTON AND COMPANY LIMITED

Bradford-on-Avon, Wilts. Phone 2191
London: Avon House, Mabledon Place, W.C.1. Euston 2201

Photograph by courtesy of La Brugeoise et Nivelles and Interfrigo Société Cooperative.

In Germany

THEY SAY
'WURST' FOR SAUSAGE

but

BECLAWAT FOR WINDOWS

Manufacturers of windows and door gear for transport in the United Kingdom, Australia, Canada, India, South Africa and Sweden.

THE BECLAWAT ORGANISATION

BECKETT, LAYCOCK & WATKINSON LTD., ACTON LANE, LONDON, N.W.10

MODERNIZATION
OF BRITISH RAILWAYS

Photograph by courtesy of British United Traction Limited

ASSISTED BY

PUROLATOR

REGD. TRADE MARK

THE PIONEERS OF IMPREGNATED PAPER FILTERS

ONE OF THE AUTOMOTIVE PRODUCTS GROUP

AUTOMOTIVE PRODUCTS COMPANY LTD · LEAMINGTON SPA · WARWICKSHIRE · ENGLAND

UNILEVER COMPANIES

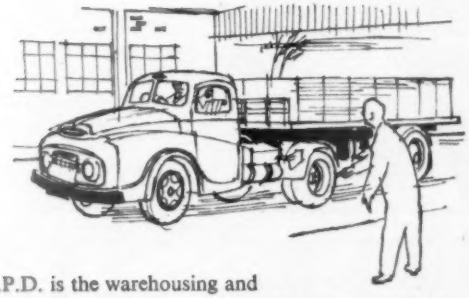
use

BRITISH RAILWAYS

Modern Freight Services

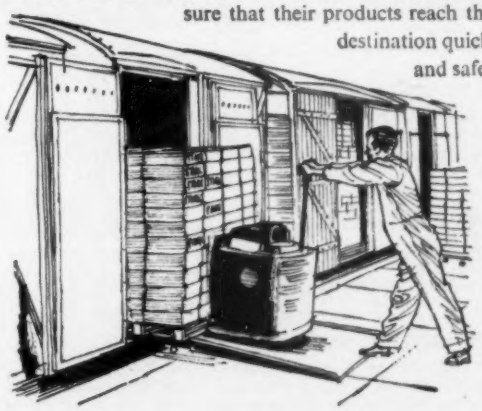
Unilever Companies transport many tons of their raw materials and finished products with the help of British Railways. There are more than 800 Express Freight trains time-tabled every weekday, many giving next morning arrivals over long distances. From many towns British Railways

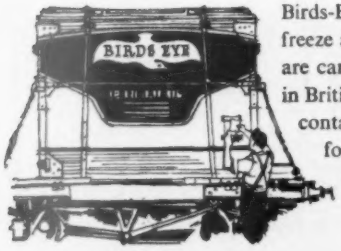
Export Express services give assured next-morning delivery for wagon-load traffic to London Docks (Royal, India & Millwall Groups), Merseyside, Manchester, Goole, Grimsby, Hull, Glasgow, Grangemouth & Southampton. Charges are fully competitive: ask your local Goods Agent for details.



S.P.D. is the warehousing and distributing associate of Unilever Ltd. Many of its depots are connected with rail sidings and take delivery direct from British Railways pallet vans.

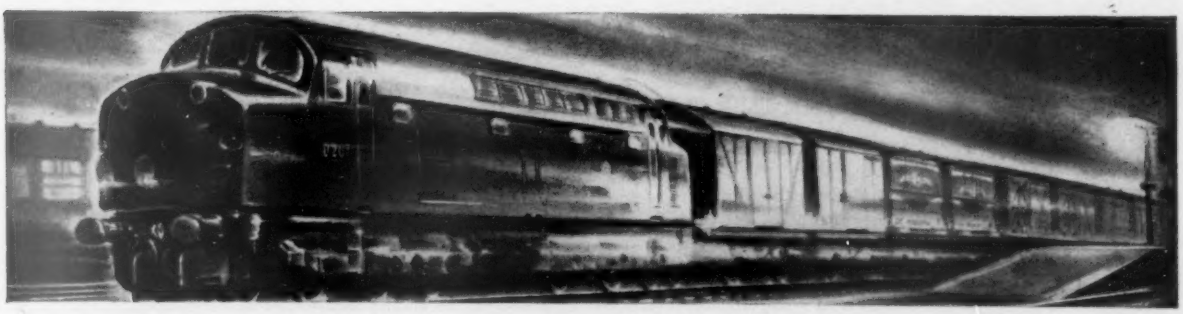
Van den Berghs & Jurgens Limited make a wide variety of margarines and cooking fats which are delivered by British Railways pallet vans to S.P.D. depots throughout the country. By using British Railways, Van den Berghs & Jurgens Limited, like other Unilever Companies, ensure that their products reach their destination quickly and safely.





Birds-Eye Foods Ltd. quick-freeze a variety of foods which are carried across the country in British Railways refrigerated containers specially designed for the purpose, ensuring that the foods are kept in perfect condition.

BRITISH RAILWAYS



25 kV 50 cycle, single phase A.C. Electric Locomotive, built in co-operation with the Traction Division of A.E.I., for British Railways.

THE BIRMINGHAM RAILWAY CARRIAGE & WAGON CO·LTD
Smethwick
TELEPHONE SMETHWICK 1888
TELEGRAMS "CARRIAGE SMETHWICK"

THE RAILWAY GAZETTE

A journal of Railway Management, Engineering, Operation, and Railway News. It covers every phase of railway activity. It is truly said of this journal that it is "Read wherever there are Railways." *Weekly* 2s. *Annually* £5 *by post.*

DIESEL RAILWAY TRACTION

A monthly review of world-wide developments in diesel-engine design, practice, and maintenance and diesel railway traction operation. *Monthly* 2s. 6d. *Annually* 35s. *by post.*

SHIPBUILDING AND SHIPPING RECORD

The only publication with direct appeal to both shipowner and shipbuilder. Its world-wide news organisation and technical articles and drawings put it in the forefront of shipping periodicals. *Weekly* 2s. *Annually* £5 *by post.*

COLLIERY ENGINEERING

A practical journal dealing with all aspects of coal production; every branch of coal mining technology is reviewed in detail and special attention is given to mechanisation and labour-saving machinery. *Monthly* 2s. 6d. *Annually* £2 *by post.*

COKE AND GAS

A technical journal dealing with the scientific and technical problems involved in the production of coke and gas in coke ovens and gasworks. *Monthly* 2s. 6d. *Annually* 35s. *by post.*

THE RAILWAY MAGAZINE

A popular magazine containing illustrated articles on Railways and Locomotives. *Monthly* 2s. 6d. *Annually* 35s. *by post.*

NEW COMMONWEALTH

Describes and illustrates significant developments in production, trade, transportation and related spheres in all countries of the Commonwealth. *Monthly* 2s. 6d. *Annually* £2 *by post.*

THE INDUSTRIAL CHEMIST

A technical journal devoted to the progress of applied chemistry and chemical engineering. It is of vital importance to the chemical manufacturer and all who employ chemical processes in their productive operations. *Monthly* 2s. 6d. *Annually* £2 *by post.*

WOOD

"Wood" is the only magazine of its kind. Primarily concerned with the use of wood, it includes articles on trees and timbers, design and construction in all decorative and practical wood usage, machines and machine practice, and trends in world supply. *Monthly* 2s. 6d. *Annually* 35s. *by post.*

FOOD PROCESSING AND PACKAGING

A journal devoted to the manufacture, packaging, and marketing of processed foodstuffs. *Monthly* 2s. 6d. *Annually* £2 *by post.*

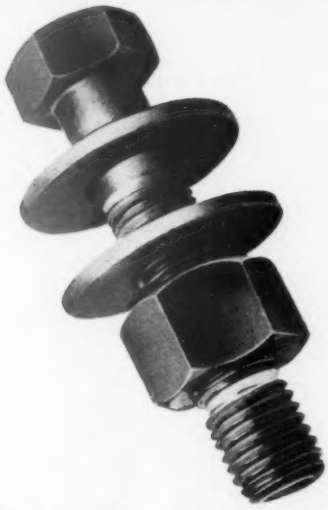
WATER POWER

A technical journal devoted to the study of all aspects of Hydro-Electric Development. *Monthly* 2s. 6d. *Annually* £2 *by post.*

MINE AND QUARRY ENGINEERING

Articles of technical nature cover geology, modern methods of prospecting, the winning of ore and stone, the dressing of ore and minerals, and extraction metallurgy. *Monthly* 2s. 6d. *Annually* 35s. *by post.*

TOTHILL PRESS LIMITED 33, Tothill Street, Westminster, London, S.W.1



Newall TORSHEAR bolts— an automatic choice ensuring scientific loading

Newall TORSHEAR bolting is proving an effective and economical method of fastening on bridge steelwork for British Railways. The special benefits of the TORSHEAR method include:
One-man operation with the special air-tool; the onus of accurately loaded bolts is transferred from the wrench to the bolt—NO control is allowed to the operator; complete uniformity of loading—no over or under tightening; and inspection is limited to a visual check that all the bolt extensions have sheared.

A. P. NEWALL & CO., LTD.
POSSILPARK • GLASGOW, N.2
Also at London and Birmingham

THE TRAIN NEXT WHEN AND WHERE TO

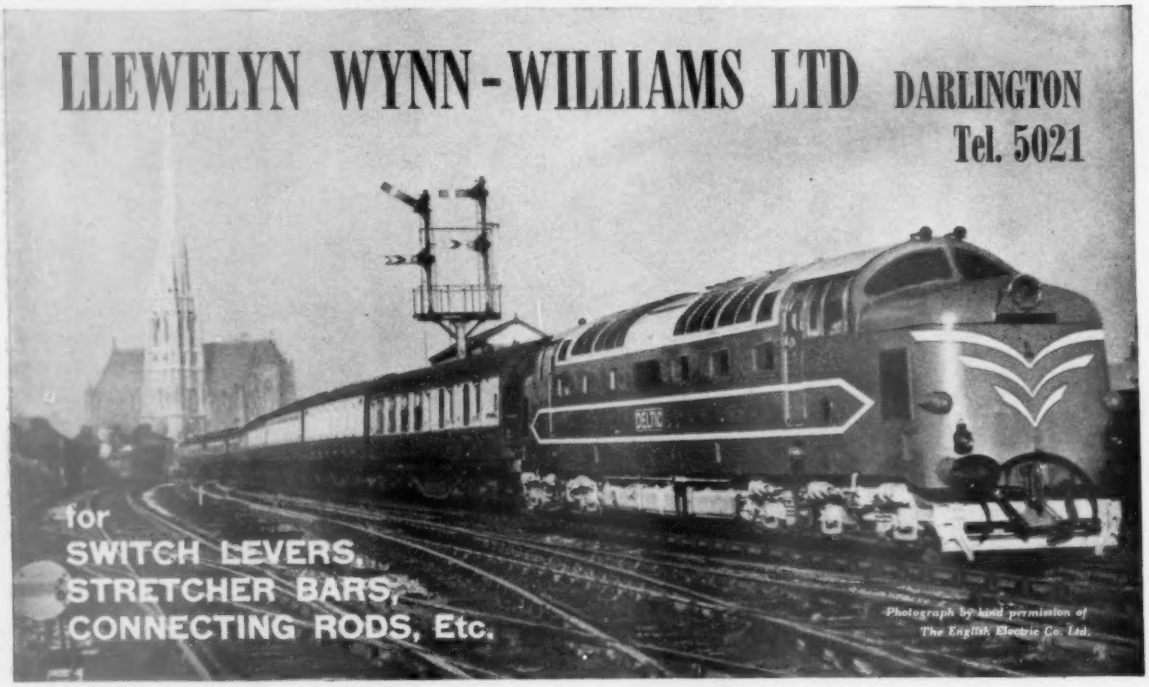
Confusion of crowds? Not with Setright! A Setright Automatic Display Indicator helps you pass vital information to your public quickly, clearly, and without trouble. Good reasons why more and more Setright Indicators are seen every day.

- Easily seen in daylight or artificial light.
- Simple remote control operation.
- Quality construction for long trouble-free life.
- All sizes available for single or multiple boards.

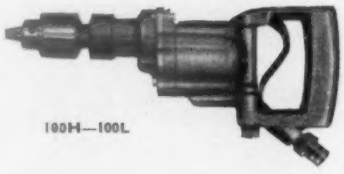
KEEP THE PUBLIC IN THE PICTURE WITH SETRIGHT

For full information write to:
SETRIGHT REGISTERS LIMITED
EASTWAY WORKS, EASTWAY, HACKNEY WICK, LONDON, E.9 Tel: AMHerst 7186

LLEWELYN WYNN-WILLIAMS LTD DARLINGTON Tel. 5021



MACDONALD PNEUMATIC DRILLING MACHINES (LIGHT WEIGHT)



100H—100L

Automatic lubrication from an oil reservoir in the body of the tool.

100WB

Adapted for use with wire brushes

Size No.	R.P.M.	Drill	Ream	Weight, lb.	Length
100H	2,200	$\frac{7}{16}$"	$\frac{1}{2}$"	$6\frac{1}{2}$	$12\frac{1}{4}$"
100L	1,600	$\frac{5}{8}$"	$\frac{3}{4}$"	$6\frac{1}{2}$	$12\frac{1}{4}$"
100S	700	$\frac{1}{2}$"	$\frac{5}{8}$"	$8\frac{1}{2}$	$13\frac{1}{2}$"
100WB	3,000	6" Cupped Wire Brush		8	15"

JOHN MACDONALD & CO. (PNEUMATIC TOOLS) LTD.
POLLOKSHAWS, GLASGOW

MARCROFT WAGONS LIMITED

For All Classes of

RAILWAY WAGON WORK
RAIL TANK CARS & HOPPERS

CHIEF OFFICE
GLOUCESTER PLACE, SWANSEA
Swansea 53128

PRINCIPAL WORKS
AT

BURRY PORT	CARDIFF	COALVILLE
PORT TALBOT	RADSTOCK	SWANSEA

TELEPHONES

Burry Port 41	Cardiff 36281
Coalville 1160	Port Talbot 3212
Radstock 3203	Swansea 54950

Subsidiary Company :—
MARCROFT ENGINEERING LIMITED
Thornborough Works, Coalville, Leics.
Also at Cardiff, Port Talbot, and Radstock

British & best

KING DICK
STILLSON PIPE
WRENCHES

King Dick Stillson Pipe Wrenches maintain the same high standard of quality expected with all our tools. The jaws are subject to a very rigid heat treatment control and are 100% hardness-tested to ensure reliability. All the individual parts are interchangeable.
Available in 8" 10" 12" 14" 18" 24" 36" and 48" sizes.
Write for illustrated leaflet.

BUY BRITISH

BINGDON **KING DICK**

Abingdon Works, Kings Road, Tyseley, Birmingham 11, England

Curtain up on a versatile performer!

Presenting John Bull, the power unit with a wide repertoire of tough railway track maintenance work. With one assistant and the minimum of props it gives a performance that's a joy to watch.
An established star with British Railways, it tops the bill—and fits the bill—every time.

SAWING—
clean through a 113 lb. flat bottom rail in 12 minutes. Between thirty and forty 113 lb. rails can be cut in one day by one operator. Cuts are smooth-faced and accurate to within 1/10".

BORING—
holes through any sleeper in 4 to 10 seconds, according to thickness. Coach screws driven home to exact tightness required in same time. Special adjustable slipping clutch eliminates over-tightening and damage to wooden ferrules.

DRILLING—
a 1⅛" dia. hole through a 95 lb. Bull Head Carbon Rail in 60 seconds. Needs only one operator. Costs only a few shillings a day to run. Special jig plates supplied with clamp ensure accurately placed cleanly cut holes.

GRINDING—
or scratch-brushing rust from all structural work. Only one operator.

Simple to operate, light to carry, completely portable. And the high speed gearbox cuts labour costs.

JOHN BULL

PETROL DRIVEN RAILWAY TRACK MAINTENANCE EQUIPMENT

For further details of this all-star equipment, write to:—

HOWARD PNEUMATIC ENGINEERING CO. LTD., FORT ROAD, EASTBOURNE
TELEPHONE: EASTBOURNE 4804-5 · TELEGRAMS AND CABLES: HOWATIC, EASTBOURNE

INDEX TO ADVERTISEMENTS

Abingdon King Dick, Ltd. 53
Abtus, Ltd. ... ... —
Aircraft Marine Products (Gt. Britain), Ltd. ... ... —
Alfloc Water Treatments Service 22
Alldays & Onions, Ltd. ... —
Allen, Edgar, & Co., Ltd. —
Allgemeine Elektricitats Gesellschaft ... ... —
Andre Rubber Co., Ltd. ... —
Armstrong Patents Co., Ltd. —
Asquith, Wm., Ltd. ... —
Associated British Machine Tool Makers, Ltd. ... 41
Associated Electrical Industries-GRS, Ltd. ... —
Associated Electrical Industries (Manchester), Ltd.... 5
Associated Electrical Industries (Rugby), Ltd. ... —
Associated Electrical Industries (Woolwich), Ltd. ... —
Associated Lead Manufacturers, Ltd. ... ... —
Atlas-Copco A/B ... ... —
Auster, Ltd. ... ... —
Austin Taylor Electrical Ltd. —
Automotive Products Co., Ltd. 48

Bagnall, W. G., Ltd. ... —
Baker, John, & Bessemer, Ltd. ... ... —
Bayliss, Jones & Bayliss, Ltd. 35
Beckett, Laycock & Watkinson, Ltd. 48
Belships Co.,Ltd.,Skibs A/S —
Benjamin Electric Co., Ltd. —
B.E.N. Patents, Ltd. ... —
Beresford, James & Son Ltd. —
Berry, Henry, & Co., Ltd. —
Beyer, Peacock, Ltd. ... —
Beyer, Peacock Gorton, Ltd. ... ... —
Beyer, Peacock (Hymek), Ltd. ... ... —
Beyer, Peacock, Railway Equipment, Ltd.... ... —
Bintex, Ltd.... ... ... —
Birfield Industries, Ltd. 31, 44
Birkett, T. M., Billington & Newton, Ltd. ... ... —
Birmingham Railway Carriage & Wagon Co., Ltd. 50
Bolton Gate Co., Ltd. ... —
Bolton, Thos., & Sons, Ltd. —
Bonded Laminates Ltd. ... —
Booth, James, Aluminium Ltd. ... ... —
Bowmaker (Plant), Ltd. ... —
Boydell, E., & Co., Ltd. ... —
Bristol Siddeley Engines, Ltd. —
Britannia Batteries, Ltd. ... —
British Electrical Repairs, Ltd. ... ... —
British Ermeto Corp., Ltd. —
British Insulated Callender's Cables, Ltd. ... ... —
British Insulated Callender's Construction Co., Ltd. ... —
British Oxygen Co., Ltd. ... —
British Oxygen Gases, Ltd. —
British Paints, Ltd.... ... —
British Railways 49
British Timken, Division of The Timken Roller Bearing Company ... —
British United Traction, Ltd. 18
Bromsregulator Svenska Akt. —
Brown Bayley Steels, Ltd.... 40
Brown, David (Industries), Ltd. ... ... —
Brush Traction, Ltd. ... 28
B.T.R. Industries, Ltd. ... 15
Bull, John, Rubber Co., Ltd. —
Bullers, Ltd. 20
Butler Machine Tool Co., Ltd. ... ... —

Caterpillar Tractor Co., Ltd. ... ... —
C.A.V., Ltd. ... ... —
Chapman, A. W., Ltd. ... —
Chipman Chemical Co., Ltd. —
Churchill Machine Tool Co., Ltd. ... ... —
Clayton-Wright, Howard, Ltd. ... ... —
Cleveland Bridge & Engineering Co., Ltd. ... ... —
Cleveland Meters, Ltd. ... —
Clyde Rubber Works Co., Ltd. ... ... —
Cobra (Wood Treatment), Ltd. ... ... —
Cockerill, S. A., Ougree ... 23
Colvilles, Ltd. ... ... —
Commonwealth Sales Corporation ... ... —
Consolidated Brake & Engineering Co., Ltd. ... 12
Consolidated Pneumatic Tool Co., Ltd. 33
Conveyancer Fork Trucks, Ltd. ... ... —
Cooper, Geo., & Sons ... —
Coventry Machine Tool Works, Ltd. 11
Cowans, Sheldon & Co., Ltd. —
Craven Bros. (Manchester), Ltd. ... ... —
Cravens Limited ... ... —
Crompton Parkinson, Ltd. —

Davey, Paxman & Co., Ltd. —
Davies & Metcalfe, Ltd. 38, 39
Dean, Smith & Grace, Ltd. —
Docker Brothers ... ... —
Dorman Long (Africa), Ltd. —
Dowty Electrics Ltd. ... —
Dragonair, Ltd. ... ... —
Drewry Car Co., Ltd. ... 17
Drummond Asquith, Ltd. 34
Du Pont (United Kingdom) Ltd. ... ... —

Eagre Construction Co., Ltd. —
Elastic Rail Spike Co., Ltd. —
English Electric Co., Ltd.... —
English Steel Corporation, Ltd. ... ... —
E.N.V. Engineering Co.,Ltd. —
Ericssons Signalaktiebolag, L.M. ... ... —
Eutectic Welding Alloys Co., Ltd. ... ... —
Expanded Rubber Co., Ltd. —
Eyre Smelting Co., Ltd. ... —

Fairclough, Leonard, Ltd. —
Falk, Stadelmann, & Co., Ltd. ... ... —
Fawcett Preston & Co., Ltd. —
Ferguson Battery Co., Ltd. —
Ferodo, Ltd. ... ... —
Fibreglass, Ltd. ... ... —
Finlay Engineering, Ltd. ... —
Flextol Engineering Co., Ltd. ... ... —
Fowler, John, & Co. (Leeds), Ltd. 56
French Railways ... ... —

Ganz-Mávag ... ... —
General Electric Co., International ... ... —
General Electric Co., Ltd. ... —
General Motors Overseas Operations ... ... —
General Steel Industries Inc. —
Glacier Metal Co., Ltd. ... —
Gloucester Railway Carriage & Wagon Co., Ltd. —
Godwin Warren (Engineering), Ltd. ... ... —
Greenwood's & Airvac Ventilating Co., Ltd. ... —
Gresham & Craven, Ltd.... —
Griffiths Bros. & Co. (London) Ltd. ... ... —
Grover & Co., Ltd. ... —

Hackbridge & Hewittic Electric Co., Ltd. ... —
Hackbridge Cable Co., Ltd. —
Hadfields, Ltd. ... ... —
Hallam, Sleigh & Cheston, Ltd. ... ... —
Hardy Spicer, Ltd.... ... —
Harper, John, & Co., Ltd.... —
Harvey, G. A., & Co. (London), Ltd. ... ... —
Hasler Telegraph Works, Ltd. ... ... —
Henderson & Keay, Ltd.... —
Henschel Werke, G.m.b.H. —
Hitachi Ltd. ... ... —
Hoffmann Manufacturing Co., Ltd. 25
Holman Bros. & Co., Ltd. —
Howard Pneumatic Engineering Co. Ltd. 53
Hudswell Clarke & Co., Ltd. —
Hunslet Engine Co. Ltd. ... 21
Hyde, Robert, & Son, Ltd. —
Hymatic Engineering Co., Ltd. ... ... —

Illingworth, E., & Co., Ltd. —
Imperial Aluminium Co., Ltd. ... ... —
Imperial Chemical Industries, Ltd. 22
Interchangeable Tool Co. ... —
Intermit, Ltd. ... ... —
International Twist Drill Co., Ltd. ... ... —
Isca Foundry, Ltd.... ... —
Isothermos, Société Internationale des Applications —

Jackson Vibrators, Inc. ... —

Kaye, Joseph, & Sons, Ltd. —
Kearns, H. W., & Co., Ltd. —
Kearsley, Robert & Co. ... —
Kendall & Gent, Ltd. ... —
Kenitra Co., Ltd. ... ... —
King, George, W., Ltd. ... 29
Kisha Seizo Kaisha, Ltd. ... —
Kitchen & Wade, Ltd. ... —
Klockner-Humboldt-Deutz, A.G. 9
Krauss, Maffei A.G. ... —
Kretz, P. Ing., Dipl. ... —
Krupp, Fried, Maschinenfabriken ... ... —
Kugelfischer Georg Schafer & Co. ... ... —
Kyosan Electric Mfg. Co., Ltd. ... ... —

Lace Web Spring Co., Ltd. 36
Lamp Manufacturing & Railway Supplies, Ltd. ... —
Lang, John, & Sons, Ltd.... —
Lamigraph Ltd. 16
Lansing Bagnall, Ltd. ... 37
Laycock Engineering, Ltd. 31
Le Carbone (Great Britain), Ltd. ... ... —
Leeds Engineering & Hydraulic Co., Ltd.... ... —
Levick, John, Ltd. ... —
Lifting Gear Products (Engineering), Ltd. ... ... —
Lockheed Precision Products, Ltd. 48
Lockspike, Ltd. ... ... —
Londex Ltd. ... ... —
London Transport Executive —
Luwa, G.m.b.H. ... ... —

Macdonald, John, & Co. (Pneumatic Tools), Ltd.... 52
Marcroft Wagons, Ltd. ... 52
Marsden, Samuel, & Son, Ltd. ... ... —
Marston Excelsior, Ltd. ... —
Maschinenfabrik Augsburg-Nurnberg, A.G. ... —
Massey, B. & S., Ltd. ... —
Matisa Equipment, Ltd. ... —
Maus, J.M.J., Ltd.... ... —
Metalastik, Ltd. ... ... —
Metallic Seamless Tube Co., Ltd. ... ... —
Metropolitan-Cammell Carriage & Wagon Co., Ltd. —
Mills, The Exors. of James, Ltd. 6, 7
Miner, W. H., Inc. ... —
Mirrlees, Bickerton & Day, Ltd. ... ... —
Mitchell, Shackleton & Co., Ltd. ... ... —
Mitsubishi Electric Mfg., Ltd. 27
Mitsubishi Heavy-Industries, Reorganized, Ltd.... 26
Monarch Controller Co., Ltd. ... ... —
Murex Welding Processes, Ltd. ... ... —

National Provincial Bank ... —
Neal, R. H., & Co., Ltd. ... —
Newall, A. P. & Co., Ltd. 51
Newton Bros. (Derby), Ltd. —
Nife Batteries, Ltd.... ... —
Nippon Signal Co., Ltd. ... —
North Bar Tool Co., Ltd. ... —
North British Locomotive Co., Ltd. 43
Nuts & Bolts (Darlaston), Ltd. ... ... —

Oleo Pneumatics, Ltd. ... —
Ormerod Shapers, Ltd. ... 34
Osborn, Samuel, & Co., Ltd. —
Ottermill Switchgear, Ltd.... —
Owen & Dyson, Ltd. ... —

P. & M. Co. (England), Ltd. —
Palnut Co., Ltd., The ... —
Parkinson Cowan Industrial Products, Ltd. ... ... —
Parkinson, J., & Son (Shipley), Ltd. ... ... —
Paterson Hughes Engineering Co., Ltd. ... ... —
Pearson Machine Tool Co., Ltd. ... ... —
Pel, Ltd. ... ... —
Permali, Ltd. 46
Peters, G. D., & Co., Ltd.... 12
Philplug, Ltd. ... ... —
Pirelli-General Cable Works, Ltd. ... ... —
Planwell Engineering Co., Ltd. ... ... —
Plasser & Theurer ... ... —
Plasser Railway Machinery (G.B.), Ltd. ... ... —
Powell Duffryn Engineering Co., Ltd. ... ... —
Preformed Line Products (Gt. Britain), Ltd. ... —
Pressed Steel Co., Ltd. ... —
Provident Mutual Life Assurance Association —

Railko, Ltd. ... ... —
Railway Signal Co., Ltd. ... —
Ransomes & Rapier, Ltd.... —
Rawlings Manufacturing Co., Ltd. ... ... —
Regent Oil Co., Ltd. ... —
Reyrolle, A., & Co., Ltd. ... —
Rheinstahl Siegener Eisenbahnbedarf, A.G. ... —
Richards, Chas., & Sons, Ltd. ... ... —
Roberts, Charles, & Co., Ltd. ... ... —
Roberts, J. W., Ltd. ... 32
Rolls-Royce, Ltd. ... —
Rozalex, Ltd. ... ... —
Ruston & Hornsby, Ltd. ... —

Sankey, Joseph, & Sons, Ltd. ... ... —
Saunders Valve Co., Ltd. 45
Scammell Lorries, Ltd. —
Scottish Machine Tool Corporation, Ltd. ... —
Setright Registers, Ltd. ... 51
S.G.E. Signals Ltd. ... —
Sheffield Twist Drill & Steel Co., Ltd. ... ... —
Siebe Gorman & Co., Ltd. —
Siemens & Halske, Akt. ... —
Silentbloc, Ltd. ... ... —
Simon Engineering Dudley Ltd. ... ... —
Simmonds Aerocessories, Ltd. ... ... —
Simmonds & Stokes (Niphan), Ltd. ... ... —
Skefko Ball Bearing Co., Ltd. 2
Smith's Industrial Instruments, Ltd. ... ... —
Smith, John (Keighley), Ltd. —
Smith, Thos., & Sons (Rodley), Ltd.... ... ... —
Smith, W., Gilmour & Co., Ltd. ... ... —
Southern Forge Co., Ltd.... —
South Wales Switchgear Co., Ltd. ... ... —
S.P.E. Co., Ltd. ... ... —
Spencer Moulton, George, & Co., Ltd. 47
Standard Telephones & Cables, Ltd. 19
Steel Coy. of Wales, Ltd.... —
Steel, Peech & Tozer ... 1
Steels Engineering Products, Ltd. ... ... —
Stirk, John, & Sons, Ltd.... —
Stone, J., & Co. (Deptford), Ltd. ... ... —
Stream Line Filters, Ltd.... —
Suffolk Iron Foundry (1920) Ltd. ... ... —
Sulzer Bros. (London), Ltd. —
Summerson, Thos., & Sons, Ltd. 13
Swiss Industrial Company... —
Swiss Locomotive & Machine Works ... ... —
Sylglas Company, The ... —

Talbot Waggonfabrik ... —
Tangyes, Ltd. ... ... —
Tarmac Roadstone Ltd. ... —
Taylor Bros. & Co., Ltd. ... 8
Taylor Bros. (Sandiacre), Ltd. ... ... —
Taylor, F., & Sons (Manchester), Ltd. ... ... —
Taylor Rustless Fittings Co., Ltd. ... ... —
Tearne & Sons, Ltd. ... —
Tees Side Bridge & Engineering Works, Ltd. ... 55
Telephone Manufacturing Co., Ltd. ... ... —
Tempered Spring Co., Ltd. —
Thermit Welding (Gt. Britain), Ltd. ... ... —
Thomas, Richard, & Baldwins, Ltd. 14
Thompson, John, Motor Pressing, Ltd. ... ... —
Thomson, Thomas, Sons & Co. (Barrhead), Ltd. ... —
Toledo Woodhead (Sheffield), Ltd. ... ... —
Town, Fredk., & Sons, Ltd. —
Transport Brakes, Ltd. ... —
Transport Engineering & Equipment, Ltd.... ... —
Trico-Folberth, Ltd. ... —
Triplex Safety Glass Co., Ltd. 10
Tulloch, Ltd. ... ... —
Turton, Geo., Platts & Co., Ltd. ... ... —
Turton, Thos., & Sons, Ltd. —
Tyer & Co., Ltd. ... ... —

United Steel Companies, Ltd. 1, 3

Vacuum Brake Co., Ltd. ... 44
Vokes, Ltd. ... ... —
Vulcanised Fibre, Ltd. ... 24

Walker, James, & Co., Ltd. —
Ward, H. W., & Co., Ltd.... 41
Ward, Thos. W., Ltd. ... 30
Werkspoor, N.V. ... ... —
Westinghouse Brake & Signal Co., Ltd. 4
White, R., & Sons (Engineers), Ltd. ... ... —
Wickham, D., & Co., Ltd.... —
Wild, A. G., & Co., Ltd. ... —
Williams, Henry, Ltd. ... 42
Winn & Coales, Ltd. ... —
Workington Iron & Steel Co. 3
Wright Anderson & Co., Ltd. ... ... —
Wynn-Williams, Llewelyn, Ltd. 52

Zwicky, Ltd. ... ... —

LONDON: Printed by ODHAMS PRESS LTD., Long Acre, W.C.2, and Published by TOTHILL PRESS LIMITED, Proprietors of THE RAILWAY GAZETTE at 33, Tothill Street, Westminster, S.W.1.
July 21, 1961

Eccleston Bridge, Victoria, London, S.W.1 for British Railways (Southern Region). The main girders of riveted construction are 11' 8" deep by 127' long, each weighing 125 tons. The cross girders average 27 tons each.

Chief Civil Engineer : A. H. Cantrell, Esq., B.Sc., M.I.C.E. Consulting Engineers : Messrs. Livesey & Henderson

Tees Side Bridge

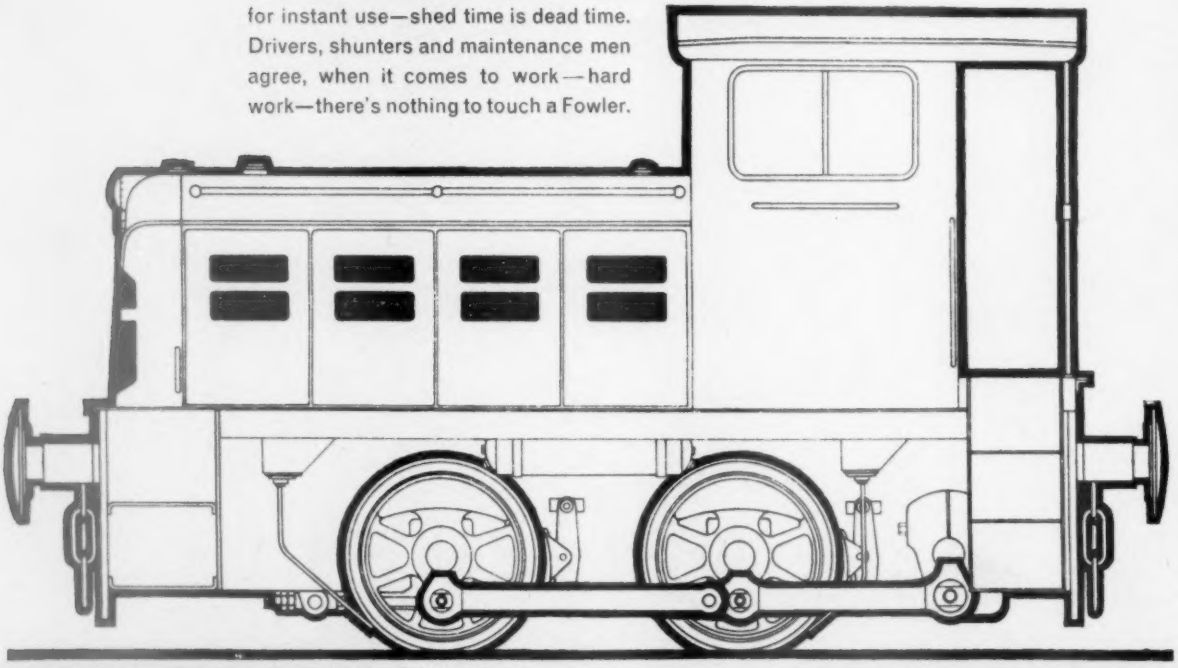
& ENGINEERING WORKS LTD. MIDDLESBROUGH

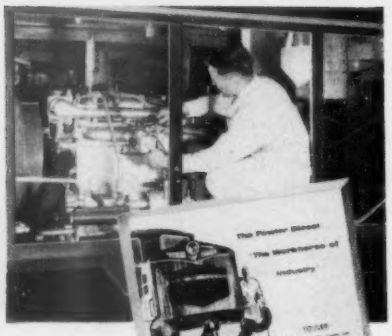
London Office: 56 Victoria Street, S.W.1.

FOWLER

MEANS FASTER HANDLING

Everything about a Fowler diesel shunter spells functional efficiency. With finger-tip control and all-round visibility it's simple, and non-tiring to drive. Maintenance requirements are even simpler, that's why this diesel is always ready for instant use—shed time is dead time. Drivers, shunters and maintenance men agree, when it comes to work—hard work—there's nothing to touch a Fowler.





There is a wide range of Fowler diesels fully described in this new technical leaflet, gladly supplied on request.

JOHN FOWLER & COMPANY (LEEDS) LTD, LEEDS 10, TEL: 30731